

The Iron Age

A Review of the Hardware and Metal Trades.

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English Blast Furnaces for Burmah.
We illustrate beneath a blast furnace plant constructed by Mr. James Farmer, of Salford, for the King of Burmah. The plant, made from designs furnished by Mr. Robert H. Holgate, chief engineer of the English Commission now in Burmah, consists of two iron cased furnaces 56 feet in height, supported on cast iron pillars, the casing being of sufficient height to admit of having boilers 12 feet in diameter.

Each furnace will be blown by three tuyeres, and there will be complete arrangements for taking off the gases for their use at the ovens and boilers.

Round the top of each furnace will be a gallery for cleaning the gas flues, and the gases will be drawn from the furnace by a circular flue underneath the floor plate of the gallery. The gases in the first instance will be taken down the gas main to an underground flue, and thence to the ovens and boilers. The arrangement is so constructed that a horizontal gas main can be afterward added if it should be found desirable.

The tops of the furnaces will be connected by a platform, and the materials will be raised to their mouths by a hoist of the water balance type, constructed by Mr. James Farmer, of Salford. The cage of the hoist has beneath it a tank which, when partially filled with water, is sufficient to lift the balance weights, and thus lower the cage to the bottom. During the time the material to be lifted is being placed on the cage a sufficient weight of water is allowed to escape out of the tank, so that on the releasing of the brake the balance weights fall and elevate the material and cage to the top. This hoist at, say, ten hours per day, is capable of lifting about 1600 tons per week, an amount of material far in excess of the consumption of both furnaces when they are working with either coal or coke. The framing of the hoist is, as will be seen, of timber, the inner corners of the corner pillars being protected by angle irons, against which the guide wheels on the cage run.

The blowing engines are of the vertical type, the framing consisting of eight fluted columns, and the blast cylinders being carried directly on the strong girders surmounting the columns, while the steam cylinders are placed directly over the blast cylinders. They are similar in style to the engines now much used in the Cleveland district, and introduced by Mr. John Gjers, of Middlesbrough, the crankshaft, however, having only one bearing on the main framing, the other end being carried by a bearing in a wall box. The two engines are independent of each other, not being coupled. The steam cylinders are 30 in. and the blast cylinders 62 in. in diameter, while the stroke is 4 ft., and the engines, at a speed of about 40 revolutions per minute, will deliver about 6500 cubic feet per minute each.

Great care has been bestowed on the arrangement of the valves of the blowing cylinders, it having been desired to avoid the waste space which is found in too many of the blast engines now in use. The valves are twelve in number at each end of cylinder, six being inlet, and six outlet valves. Each valve has a series of openings $5\frac{1}{2}$ in. long, and $\frac{1}{4}$ in. in width, and the six valves forming each set have the effective area of 167 in., an area which, we may mention, is very much smaller in proportion to the size of the cylinder than that now generally adopted in the Cleveland district for similar quick running engines. All the valves are of exactly similar dimensions in each case, all the inlet and outlet valves being alike.

The pistons of the blast cylinders are of a cast iron frame, covered top and bottom by wrought iron plates $\frac{1}{4}$ in. in thickness, this construction reducing the weight of the pistons to a minimum. All bolts for screwing down the packing are let in level with the cover rings, and the pistons work within $\frac{1}{4}$ in. of the top, and $\frac{1}{4}$ in. of the bottom cylinder.

The piston rods are guided by parallel motions instead of fixed guides. From the levers of the parallel motions are worked two double acting pumps each 6 in. in diameter and with 2 ft. stroke, which raise water for the supply of the blast furnace plant.

The workmanship of these engines is characterized by accuracy and careful finish, and His Majesty of Burmah will have a pair of blast engines equal, in this respect, to any yet erected in Great Britain. There will be five boilers for the blast engines, each of 30 horsepower, arranged for working with coal, charcoal, or gas.

The Niles (O.) Iron Company is boring for gas.

Prouty's Automatic Trap for Steam Heating Apparatus.

Our illustration represents an automatic steam trap invented and patented by C. A. Prouty, of Rochester, N. Y.

It is claimed for this that after condensation will return the water in a continuous stream from the radiating pipes to the boiler below the water line at a temperature as high as 180° or

is Geo. W. Harrold, of Rochester, New York, who will furnish any information desired.

The French Coal Commission.

The report of the French commission of inquiry into the coal industry of that country has just been made public, and deals very exhaustively with the subject of what is termed the "coal crisis." So far as France is concerned,

of tons annually. It is worthy of notice, too, that of late years this production has been very largely and rapidly increasing; but notwithstanding such a rapid increase, there is still large difference between the production of coal in France and the consumption. In fact the deficiency is stated to be about 30 per cent., for while the production is about 17,000,000 tons, the consumption amounts to 24,000,000 tons, thus leaving the 7,000,000 tons of deficiency

With regard to mines not worked for the alleged reason of their being unproductive, it is further mentioned as desirable that if the concessionaire, after being allowed a certain time does not work them, they are to revert to the State to be disposed of, if advisable, to other concessionaires. The commission also report that the railway tariffs for the carriage of coal present great inequalities, and they call attention to the subject, so that reform may be introduced. It is mentioned, indeed, that there are some mines of which the yield would be important, which are condemned to inactivity in consequence of the absolute want of railway transport. In conclusion the commission deprecate the idea of State intervention in working the mines or in the sale of their productions.

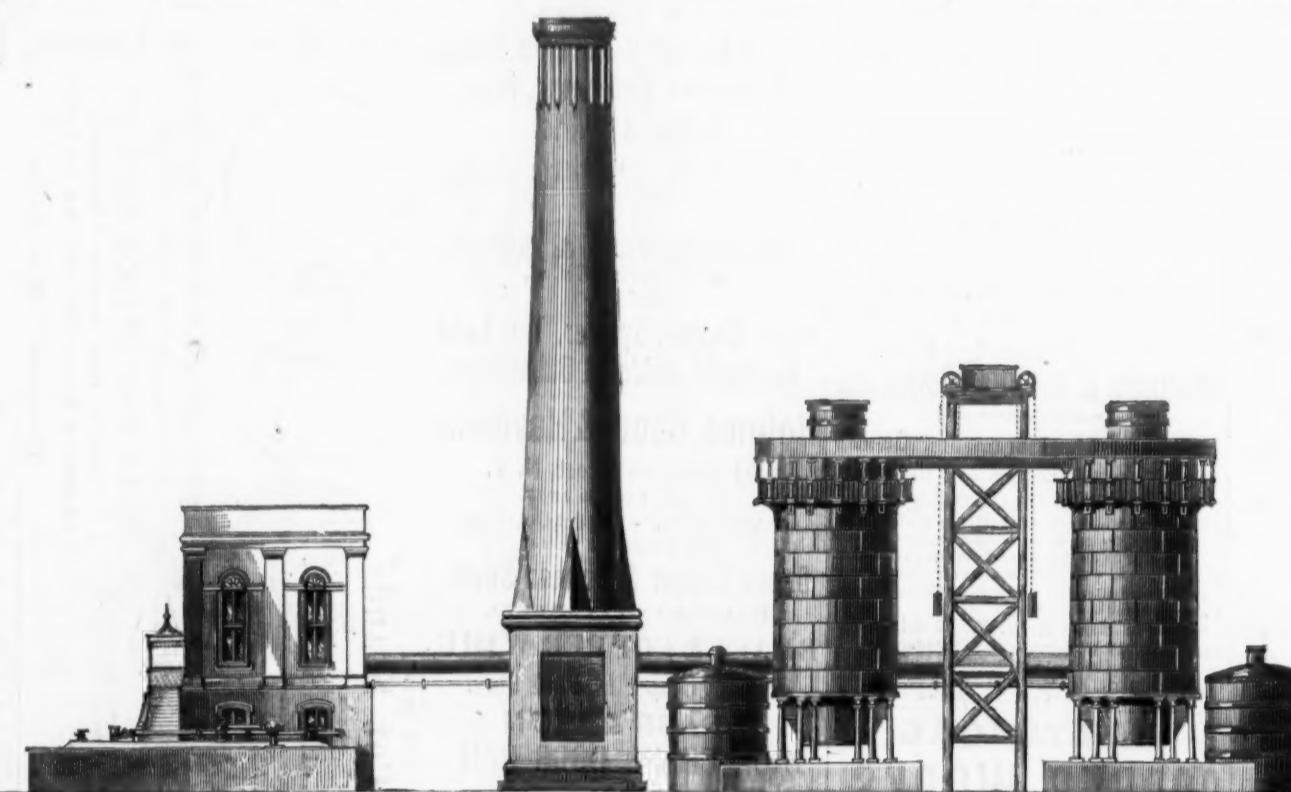
German Artillery.

A correspondent of the *Times* writes: "The committee of the Reichstag, after a prolonged discussion of the Landsturm Bill, has come to a definite resolution rejecting clause 3, which allows the government to incorporate Landsturm battalions into the Landwehr. If the Reichstag adopts this decision it will destroy the marrow of the scheme, and the government, surprised and a little irritated at the determination of the committee, is, of course, preparing an energetic opposition to it. There is no doubt that the Reichstag will reject the resolution of the committee, for it will understand that this would be almost tantamount to the rejection of the entire bill. It will be remembered that 400 millions of the war indemnity were reserved for the restoration of the war material disorganized during the campaign. It was necessary to provide for the requirements of 363 batteries and 166 columns of munitions. Provision has been made in the course of this year

for 166 batteries and 118 columns of munition; 348 light field guns have been ordered of Krupp, and 1820 heavy guns, 25.8 gun carriages, 25.0 limbers, 2045 wagons for 94 columns of artillery munitions, 4336 wagons for 363 batteries, 77,213 chests for projectiles, 84,947 cases for cartridges, &c. The munitions required for 278 field batteries for the reserve for the park of munitions is estimated at 325,000 shrapnel shells, 50,000,000 cavalry balls to fill these shells, 458,072 cartridges, 814,068 grenades, 2,309,310 kilogrammes of coarse powder, and 384,120 metres of silk. All this has been manufactured during the present year. Forty guns of 12 centimetres diameter have also been cast; 40 short guns of 15 centimetres, with their carriages, 1995 gun carriages have been adapted for siege guns, and 187 steel guns of 15 centimetres, and 723 bronze guns of 12 and 15 centimetres have been transformed."

Accidental Discoveries in Science.—Accident has had much to do with chemical discoveries, more perhaps in former times than now, when researches are undertaken with some definite end in view; but how many of the discoveries which have led to the most brilliant and important results, may not be called accidental? We may question if Davy expected to find potassium when acting on potassa with a voltaic battery, although, having already observed the decomposition of other metallic oxides, he may have had an inkling of the fact. Bunsen did not expect to find two new metals when examining the residue from the Durkheim waters. Crooks, when looking for selenium, accidentally found thallium. Perkins, when he found that aniline, when acted on by chromic acid, gave a fine color, could scarcely have expected the enormous manufacture of those analogous dyes which is carried on at the present day.

M. Victor de Lesseps and Mr. Stewart have printed their report upon the journey they recently undertook for the purpose of tracing out a railway line between Turkistan and India. It appears from the report that, baffled by the Hindoo Koosh, they turned east, and found Kashgar to be connected by open and very gradually ascending valleys and plateaus both with Khokand and Cashmere. That this is undoubtedly so was repeatedly stated two years ago in the Russian intelligence of the *Times*. M. de Lesseps thinks that the most practicable road starts from Lahore and reaching Serinapar through the Valley of the Jhelum, proceeds through the Sotchil and Karakorum Passes to Yarkand, Kashgar, Khokand, Tashkend, Orenburg, Ekaterinburg, and Moscow. We may add that the Russian Government are in no hurry to act upon this advice. They will for the present content themselves with constructing a line from Orenburg to Southern Siberia. From this trunk line another may eventually be branched off in the direction of Tashkend. At the same time, the project of a canal between the Caspian and Aral is still under discussion.



BLAST FURNACE PLANT FOR THE KING OF BURMAH.

even higher, thus requiring a very small amount of heat to again raise it to the boiling point.

As there is no machinery to get out of order, this trap, working automatically, requires but little, if any attention, and will keep the pipes comparatively free from water, thus increasing their radiating power. It is also claimed that very little water needs to be introduced into the boiler by the pump or other means.

the report states that the crisis is of foreign origin, having commenced in England, six months later proceeded to Belgium, and nine months afterward to France. The cause of this crisis is attributed to the largely increased demand of the iron trade, which from 1871 to 1873 largely augmented its production. It is pointed out that the intensity of the crisis in the French coal producing districts has been in inverse

to be made up by importation. In view of this state of affairs the commission urged the importance of all reasonable measures being adopted for the purpose of increasing the coal production of the country, so that the demand may not largely exceed the supply. The State, it is pointed out, should encourage the research for new coal beds, and as a means of doing this, should intrust mining engineers with pre-

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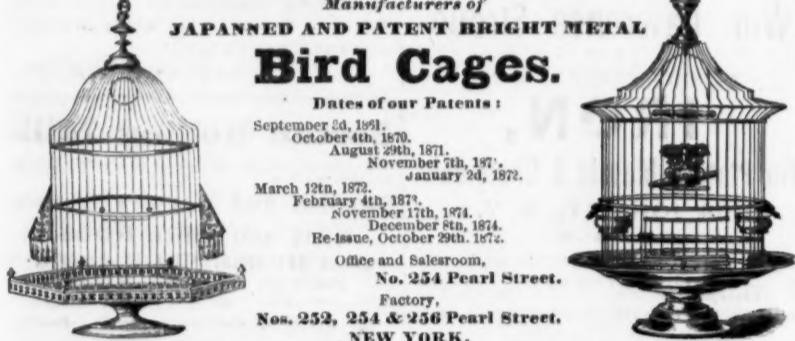
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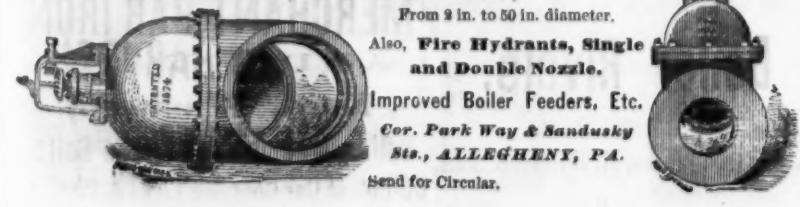
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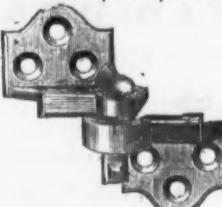
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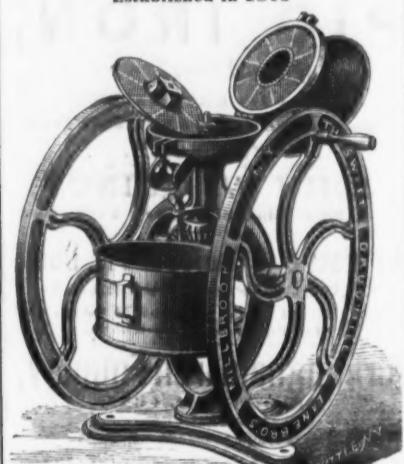


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Steam Boiler Explosions.

We have received from Mr. A. T. Hay a copy of his report to the Secretary of the Treasury on the subject of boiler explosions, from which we take the following:

When we boil pure water the steam rises regularly in spheres from the bottom of the vessel to the surface of the water.

"The volume of a confined mass of steam is inversely proportional to the pressure to which it is exposed, and directly proportional to its absolute temperature." Steam at a like temperature and pressure has at all times the same number of molecules in a like volume, and the true measure of its energy may be calculated with mathematical precision. Water assumes three natural, or allotropic forms—liquid, solid and vapor; in all these forms its qualities inhere. What is true of a molecule of water, ice or steam, is true of the whole volume of either—these several forms being due entirely to a change of temperature.

Water is the most stable compound in nature; neither pressure, cold nor heat alone will reduce it to its original elements.

It also has a greater capacity for heat than any other known substance, except hydrogen gas.

Water, per se, is as true to its peculiar characteristics under the various degrees of temperature and pressures to which it may be subjected as the magnet is to the Polar star. Steam is an elastic fluid, and has the true measure of its energy in any given case directly proportional to its temperature and pressure. These two conditions supplement each other.

Now, the volume of a confined mass of steam being inverse to the pressure to which it is exposed, a rupture in a steam boiler must instantly reduce the internal pressure and relieve the stress; and, on the other hand, the pressure being directly proportional to the absolute temperature, the checking in of cold water reduces the temperature and relieves the pressure or tension; which brings us to the logical conclusion that neither a weak place in a boiler nor the supplying of cold water are, in themselves, the least sources of explosion. "But," we are told, "it is the discharging of cold water to red hot iron that does the mischief." Let us look at that in the light of truth. In the first place, water has nearly ten times the capacity and affinity for heat that iron has, and I will defy any man to heat any part of a boiler or open kettle red hot with an ordinary blast, so long as there is any considerable quantity of water therewith; beside, if it were possible to have any portion of a boiler "red hot," it would be above the water line—whereas, the cold water (on river steamers) is supplied either through the mud drum or discharged by feed pipe near the bottom of the boiler. Now, it is a fact that boilers blowing up under such supposed conditions generally do so at the first or second stroke of the pump. Then, I would ask, how high a few strokes of the pump will raise the hot water over a battery of boilers? Not the thickness of a sheet of brown paper.

Another fact is that many of our most terrible explosions take place under a reduction of pressure—that is, the boilers become, as it is termed, "fire hard," and sometimes it is with difficulty that a medium gauge of steam is kept up; in fact, I have known instances wherein just before an explosion ensued the steam gauge would recede from 50 pounds to 20 pounds pressure, and no amount of firing would bring up the pressure sufficient to perform the work satisfactorily. If there had been a scarcity of water there would have been a surplus of steam. When boilers fire easily and steam freely there is no danger of any fearful disaster. If a boiler gives way under such conditions it is at its weakest point, which lets off the excessive pressure and relieves the stress instantly over the whole battery. Such accidents are of frequent occurrence. They are simply ruptures, the effects of over-pressure, and not explosions in any sense of the term.

There can be no violent explosion from steam made from clean water, free from organic matter. At least, after many years close observation, coupled with direct investigation and research, I have failed to find an instance where pure simple steam made from clean water ever exploded within a range of from 15 pounds up to 500 pounds pressure to the square inch. But I do find that explosions in steam boilers (like cholera, typhoid fever &c.) revel in filth and foul water, and may be traced directly to the same source.

Take, for instance, the Mississippi and its tributaries, and it will be found that steamboat boiler explosions have been most frequent in the vicinity of large cities, and as we go down the river. The Lower Mississippi has been termed a graveyard, while in that portion of the river above St. Louis, including the Illinois, where the waters are comparatively pure and free from nitrogenous matter, explosions have been very rare, while the Ohio, from Cincinnati down, is noted for many steamboat disasters. The most destructive and terrible explosions have occurred in the spring of the year, when the waters were loaded with organic substances, earthy salts and oleaginous matters.

My researches lead me to a positive conviction that these disasters have their origin in the impurities contained in the water. In a paper like this it is impossible to go into detail, or to give reasons and incidents running through many years' observations, investigation and research, but I think that the following will give a sufficient idea to enable all to see the importance of avoiding foul water for steam purposes:

When we boil foul water we find it tumultuous, accompanied with a low, bumping sound, with fits and starts, so sudden and violent in some instances as to jump bodily out of or even burst an open vessel. This antagonism to the boiling of any compound solution is caused by the attraction of these foreign particles for each other (chemical action and re-

action), while in the boiling of pure water there is no chemical action whatever. Great rivers, like those of the Ohio, Mississippi and Missouri valleys, are great natural sewers, and their waters at certain seasons of the year are loaded with organic remains in every stage of putrefaction, while city wells and those around factories frequently become great sink holes and receptacles for foreign matter. My researches show that such waters hold in solution and carry in suspension from six up to sixty-three grains per gallon of organic substances, to which may be added copious quantities of oleaginous matter in certain localities and the salts of ammonia—NH₃. These substances find their way into steam boilers where they rapidly undergo chemical change, distillation, concentration, and sometimes violent decomposition—that is, culminate in terrific explosion.

These organic skeletons, glyceric salts, albuminous substances and ammoniacal gases found in water consist chiefly of carbon, hydrogen, oxygen and nitrogen; and it is among such nitrogenous combinations and types that we find some of the most remarkable explosive bodies. They are not only aeriform, but they are gases of the most subtle and potent character; gelatinous substances, in which the different elementary atoms are all chemically combined in the same molecule that are liable to sudden and violent decomposition whenever the opposing forces to which they owe their existence become deranged by heat or some external cause. Their affinities are very feeble; hence their frequent destruction at high temperatures. Merely a molecular disturbance of any kind may cause violence. Their combustion being internal and instantaneous, they develop a force at least ten times greater and a hundred times quicker than that of steam pressure—sudden and violent enough to destroy open vessels.

"The instability of all nitrogenous compounds is the striking peculiarity."

No amount of pressure or cold is able to reduce their aeriform gases to the liquid or solid condition again. But in clean water we have the most stable substances known, under three distinct forms, either of which may be safely had out of the other by merely a change of temperature. As I said before, heat alone will not decompose water, but electricity readily resolves it into its original elements, and chemical action being the source of electricity, water in the midst of fickle and treacherous company becomes demoralized and loses its virtue and stability, and goes off in a gaseous state in time of chemical reaction. This frequently occurs when boilers explode, as neither water nor steam are ejected from them, but an inflammable gas is evolved. Under such conditions the engineer, dead or alive, is convicted of murder for allowing the boilers to become dry, when, in reality, a moment before the explosion his boilers contained a full gauge of water.

"Great power in the hands of ignorant managers implies great dangers," which has been practically illustrated in American steamboating, railroading, &c. Science takes things as it finds them, and occupies itself in tracing relations and dependences among phenomenal effects. Any investigation to have any permanent value must be based upon the natural order of things. It must be interwoven with matter, force and truth. Their intelligence becomes a true mirror that reflects things as they are. It is only by well observed and well digested facts, through patient investigation and research along the varied lines of nature, that we generate new and recast old ideas and arrive at truth and practical utility.

Economic Method of Drying Foundry Molds.

In almost all foundries the drying of the molds is effected by means of sheets of iron, on which a fierce coke fire is maintained. Here, evidently, is a great loss of caloric, for the drying is only effected by radiation, and in a space where the air has generally free access. In the case of large castings, such as cylinders, fly-wheels, framing, &c., this plan has also the disagreeable effect of producing great heat all around, and the molders engaged in the same building suffer seriously at times. In addition to this, it is mostly necessary to employ a crane to sustain the frame, or to employ heavy materials which have to be brought to the spot and afterward carried away again, disarranging the material of the foundry and giving rise to unnecessary work.

No improved method had been attempted that we are aware of until a few months since, when M. Dehamme invented and patented a plan which was introduced four months ago into the foundry of MM. Quilliac & Co., at Anzin, of which M. Dehamme is foreman.

The arrangement is very simple. Near the most convenient end of the mold a hole is dug in the ground, and in this is placed a coke stove, which communicates with the mold by means of a short horizontal pipe, through which all the gases of the coke pass. On the other end of the mold is mounted a chimney-pipe, the upper end of which is carried out through the roof or side of the foundry. In the chimney is a damper to regulate the draught. The stove, being partially or entirely sunk in the ground, there is little or no radiation from that, and little loss of heat, and consequently of fuel, as the whole of the gases enter and pass through the mold, and are at once carried away by the pipe into the open air.

The economy is great. In certain cases in which, according to the old method, it would have required a ton of coke to dry the mold, it is effected by the new mode with one-fifth of that quantity; the saving is, however, not generally so great as this, but is said to amount to the average to 50 per cent. During the four months that M. Dehamme's system has been at work at Anzin, it has realized an economy of 600 to 700 fr. per week in the saving of coke alone, and the lighting, which, in the old time, consumed seven steres of wood per month, is now easily effected by means of a few shavings or pieces of waste wood.

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The original factory was not situated in the immediate locality in which the business is now carried on, although that business has been conducted in the premises in which it is still conducted, that is, in Scotland Road, Warrington, near the central part of the town.

The original portion of these premises consists of what no doubt was then considered large, but with advancing ideas and the requirements of an increasing trade have now dwarfed into a comparatively small quadrangle of brick building, which still remains intact, and bears upon the lintel of its principal door the date of 1802. Subsequent to that date, and at different periods, additions to the works have been made till what may be called the nucleus of the establishment has been surrounded by extensive and stately buildings, all devoted to the accommodation of the different branches of manufacture which constitute the staple of the business. The latest and largest of these additions bears the date of 1860; and, so far as can be judged by present appearances, there seems every probability that that will ere long cease to be the newest portion of the works. Beside the establishment in Warrington, it must be stated that there is a large branch of the establishment at Rotherham, where an important and valuable portion of the work is conducted, viz., the conversion of the steel from which the various implements are made. It is also equally worthy of remark that a very considerable amount of the work of different kinds is carried on by workmen in their own homes; so that, when considering the resources of the establishment, it must be borne in mind that those manipulative resources under control, or directly connected with the works of Peter Stubs, are not by any means to be measured by the facilities afforded on the premises at Warrington.

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dimensions of files whatever their size or the purpose for which they are intended. Once secured on the anvil, the cutter, applying a sharp but bluntly angular chisel to the blank, and placing it at the required angle, both as to the obliquity of the furrow to the longitudinal section of the file and also to what may be called the angle of incidence for raising the required burr on the surface of the file, he strikes it a smart blow with a hammer of peculiar construction. It is an oblong mass of steel, with the handle fixed in it at an acute angle near its upper end. These hammers, which are all nearly alike in form, vary greatly in weight in proportion to the work they are to be employed upon; some of them weighing 11½ lbs., and others so light as to be under an ounce in weight; the latter, it may be readily supposed, being for exceedingly delicate work, while the former, as may be equally obviously conjectured, is employed in the production of work of a bold and vigorous character. In all cases in which the edges of files are toothed the edge-teeth are cut first. Each blank is then submitted to the process on its side. In the case of single cut files, this is of course completed by the cutter passing his chisel once over the surface from point to tang, and the process so far as that side is concerned, is complete. In the case of double cutting, however, the operation is repeated; in the latter instance the chisel is held at about right angles with that portion of the surface of the file which has been first cut, and in this form the cutting is completed, as before, from point to tang, and thus the teething of one side of a double cut file has been accomplished. The second side has then to undergo a precisely similar series of operations; but in this instance the toothed side of the file has a lead or pewter cushion interposed between it and the anvil to prevent the newly-made teeth from being damaged, if not indeed obliterated. In the case of triangular or other flat-sided files, the processes of cutting are precisely similar to those already described.

Round files, or those with semi-circular or other curvilinear cutting faces, the process of cutting or toothing is different. In these cases the cutting is performed in what is called courses. That is to say, the angular burr is struck by the chisel from the point to the tang end, in a line which, of course, varies in width, according to the breadth of the curved surface, and this is repeated until the whole of the surface has been covered by those longitudinal courses. The cut surfaces in all instances being, as before stated, protected by a pillow, or cushion of pewter, during the time the file is under the operation of the hammer. Files are of various forms and greatly differing lengths and sizes, in accordance with the purposes to which they are intended to be applied. In section they are made round, oval, segmental, square or triangular. In length they vary from 24 inches in length with a proportionate width of surface and thickness to the size of little more than a carpet needle in diameter, and an inch and a quarter in length. These latter are round files, and, notwithstanding their tiny dimensions, they also are cut in courses, which, however, are so delicate as to require the aid of a powerful magnifying glass to realize the existence of. Indeed, some of the files are so small that, to use the expression of one of the workmen, "they will swim in water. Beside the classes of files above referred to, this establishment also produces curved files of spatula and other forms for the use of sculptors for trimming and smoothing portions of their artistic productions in marble or bronze.

After having been cut, which is always done when in an annealed or softened state, they require to be tempered or hardened, and as they, speaking generally, are to be employed in operating on all kinds of unyielding substances, they are tempered to the hardest pitch that can possibly be obtained. This object, as experience has taught in Mr. Stubs' establishment, is best attained by putting the heated file into a cold mixture of salt and water. Preparatory to the heating, however, the files are dipped into a vessel filled with barn bottom, obtained from the breweries' refuse. A coating of this semi-liquid matter adheres to the file, which is then thrust among a dry powder, consisting of a mixture of ox hoof and salt. This, beside drying the paste adhering to the file, contributes not only in forming a protection to the teeth of the files from injury by friction on the coke in the tempering furnace, but likewise, by some little understood chemical process, contributes to the hardening of the file. For tempering the larger files they are heated in an ordinary smithy fire, fed by coke, and stimulated by large bellows till the file becomes of a deep blood red heat, the workmen carefully inspecting the process of heating to ensure its thorough equality all through the piece. Having ascertained this, he carefully withdraws the heated implement from the fire, and slowly and carefully dips it gradually into a large tub of the salt and water already referred to. In performing this immersion, he with equal care and caution swings it gently and edgeways from side to side, and finally drops it into the tub; this care and caution are used to prevent any warping of the file during the progress of its cooling. The smaller files are treated in a somewhat similar manner, with the difference that the fire in which they are heated is a kind of cupola oven, formed of coke ashes mixed with salt and water, which forms a paste capable of drying to a sufficient hardness to last for a week. The processes of heating and cooling the small files for tempering are precisely the same as those employed for the larger, differing only in degree. If in defiance of all precautions to the contrary, some slight twisting should have taken place in the dipping, the twist is reduced by passing the file under pressure over a heavy mass of hot iron, the file being copiously supplied with rape oil. This process is what is called "setting," and, generally speaking, it is very effective.

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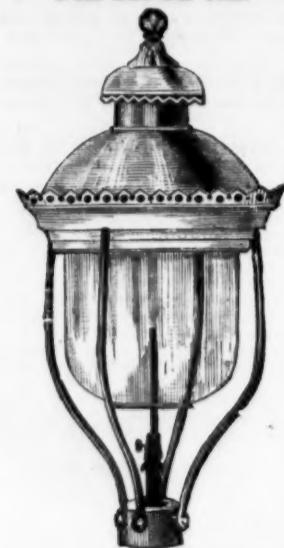
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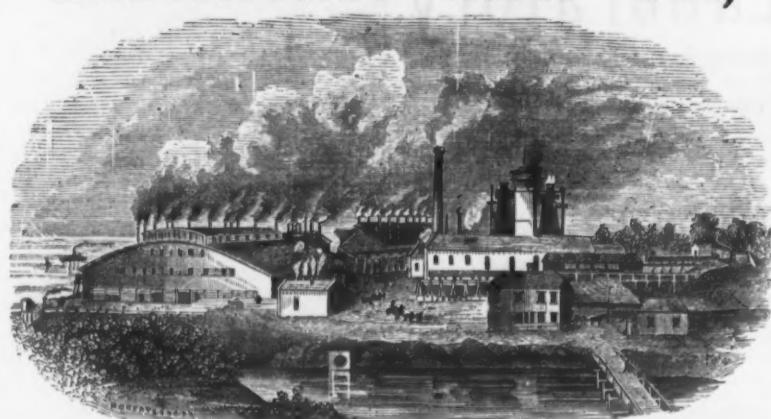
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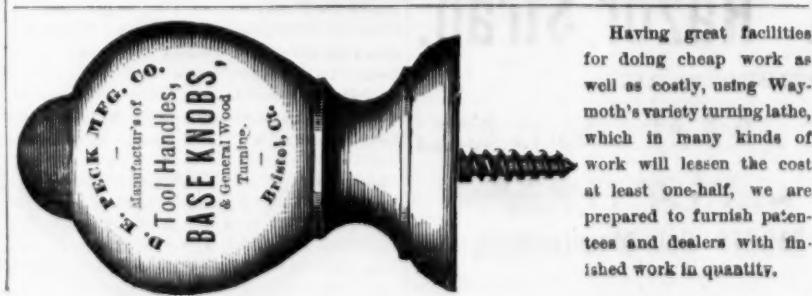
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Of any length or diameter, for Steam Engines, Exhaust Steam, Fire Purposes, Refineries, both Faced and Drilled and Plain Also.

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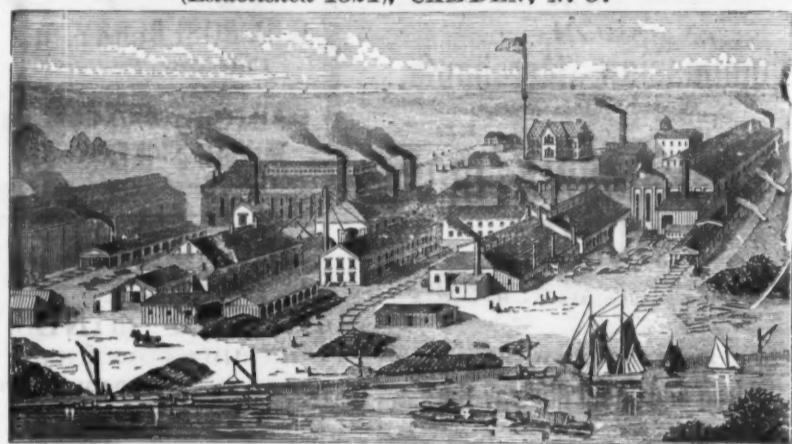
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Plans, Drawings, and Specifications promptly furnished.

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Surplus Stocks of Various Sections always on hand.

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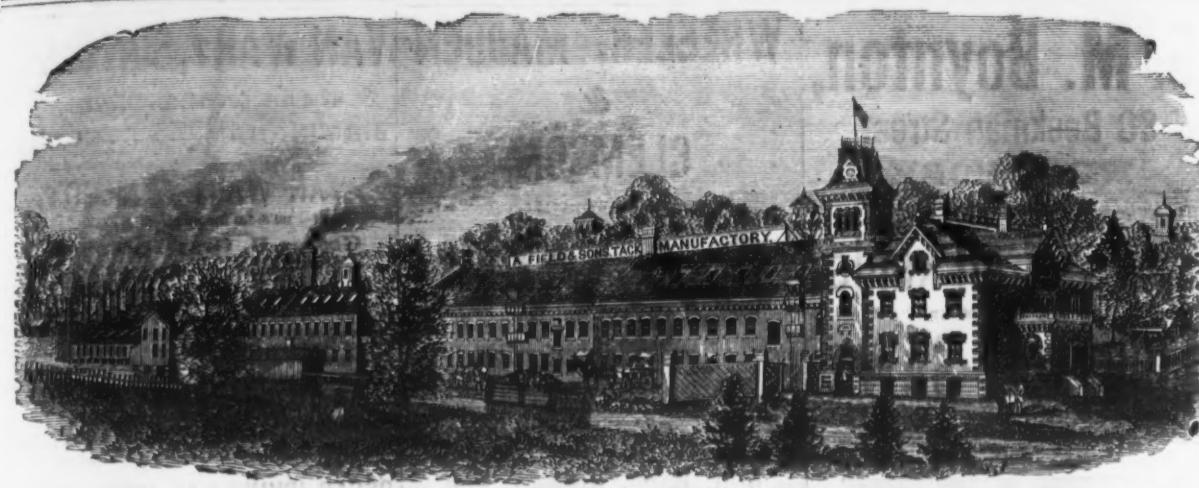
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SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

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Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks,
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WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for
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Any variations from the regular size or shape of the above named goods made from samples, to order.

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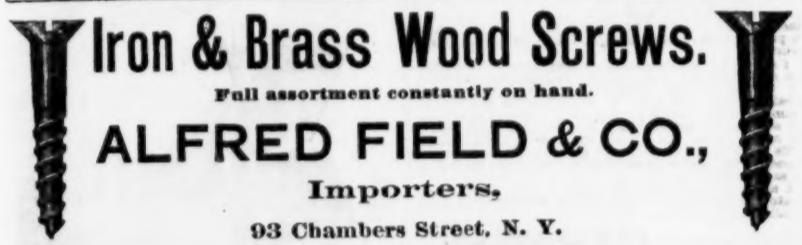
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Hand Made Locks and Real Bronze Hardware.

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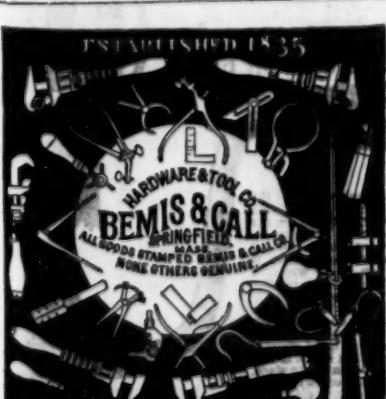
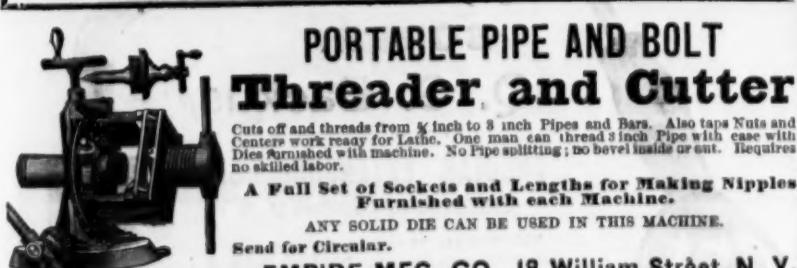
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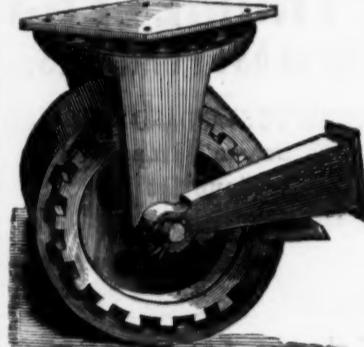
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Endless-Lever House & Weight Mover.

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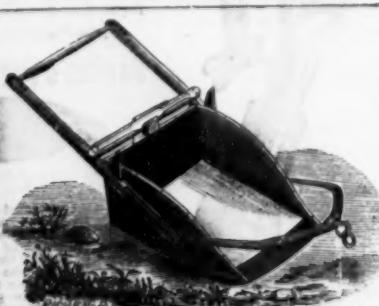
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ELECTRO-NICKEL PLATING

On all Metallic Articles finished in the best manner.

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BUSINESS ITEMS.

PENNSYLVANIA.

Dawson & Bailey, of the Connellsburg Locomotive Works, are adding to their buildings a structure 109x45 feet, in which they will place their locomotives while receiving the "finishing touches." A few days ago they shipped a locomotive to the Ohio and Toledo Railroad Company, and are now at work on four of the great Mogul engines, to be shipped to St. Louis, and have orders for seven more of the same pattern for different other roads.

The Pennsylvania Tack Works of C. P. Weaver & Co., at Norristown, makes over 600 different grades and sizes of small nails and tacks, embracing carpet cord, upholster's gimp, cheese box, miners' cigar box, lasting, lace and every other variety of fine tacks; also finishing, trunk, clout, Hungarian, Swedes and American iron shoe nails, zinc and copper nails of all descriptions, and 3d fine boat and roofing nails. The building is 35x150 feet, two stories, in which are as many tack and shoe nail machines as it will contain.

Several acres of ground are about being purchased or leased in this city for the storage of pig iron manufactured in this region.

Six acres have been leased at Allentown for this purpose, and similar yards are to be established at Reading, Scranton and Pittsburgh. Each manufacturer is expected to send his iron to the yard, paying five cents per ton for weighing and storage. On the receipt the manufacturer will receive a certificate, which will be negotiable. This is the English plan of storing pig iron at producing cities instead of at the seaboard. —*Harrisburg Patriot*.

The Sharon Times says that Kimberly, Carnes & Co.'s Iron Works, of that place, will resume operations immediately after the Christmas holidays, in all its branches, with a reasonable prospect of continuing all winter. This will be gratifying intelligence to many of our people, who apprehended dire results from the idleness which was threatened.

NEW JERSEY.

The works of the Phillipsburg Manufacturing Company are being run with a full set of hands. The manufacturers of the company consist of nuts, bolts, special forgings, etc., besides which they take contracts for all descriptions of bridges. They have a machine shop, 40x200 feet; finishing shop, 50x100 feet; blacksmith shop, 70x100 feet; pattern shop, 30x40 feet, and warehouse, 35x45 feet, two stories. About 250 men are now employed.

The Phenix Iron Works, at Trenton, are preparing the materials for an iron bank building which is to be erected in Port au Prince, Hayti.

The last of the iron work for finishing up the interior of the New York post office came out of the sand at Carr's foundry, Trenton, last week.

At Phillipsburg, the Warren Foundry and Machine Company are engaged in the manufacture of cast iron gas and water pipes. The company was organized in 1856, and have now a capital of \$300,000. The works cover about ten acres of ground, and have been steadily running since the panic, turning out 25,000 tons of pipe annually, valued at \$1,500,000.

CONNECTICUT.

The Meriden Britannia Company have shut down their works for three weeks, to give them an opportunity to make necessary repairs and take an inventory of stock.

The New Haven Manufacturing Company, of New Haven, Conn., manufacture a great variety of machinist's tools, making a specialty of lathes, planers and drills, for which they have established a high reputation. Their main buildings are of brick, 230x45 feet, and two stories in height, with an L 175x45 feet, and two stories, with other buildings connected. They employ, when running to their full capacity, 150 hands. This is a stock company, organized in 1852, with a paid-in cash capital of \$275,000, and have no liabilities. Their works cover about three acres. They have recently made very valuable improvements on some of their machinery, among which may be mentioned a planer 30 feet long, 6 feet square, weighing 40 tons, with double heads and all the modern improvements; also, a lathe with 41 feet bed.

The horse nail factory at New London has resumed operations.

It is expected that the new Tariffville screw factory will start in the spring. The works consist of three fine brick buildings, an office, a large building for packing and the factory. This latter is 225 by 80 feet. Men are busily at work laying the floors and getting it ready for the machinery.

Southington seems to be waking up again from its period of dullness. H. D. Smith & Co.'s shop is running full time, ten hours a day. The rolling mills commenced work on the 23d ult., without a reduction of wages.

MASSACHUSETTS.

Smith & Wesson, the Springfield pistol manufacturers, have taken a contract to make 10,000 of their largest size pistols for the Russian army.

The Border City Herald says: "The Atlantic Works, of East Boston, have contracted with Messrs. Joseph Church & Co., of Fall River, to build for them a steam vessel of the following dimensions: Length 110 feet, breadth 18, depth 8, with her accommodations, engine and all complete, to be employed in the porgy fishery. She will have an upright condensing engine, with 18 inches diameter of a cylinder and 18 inches stroke of piston, applied to a propeller about 6 feet in diameter with 4 blades."

Johnson Bye & Co., Worcester, occupy over 15,000 feet of shop room and employ 100 hands. They manufacture 5 and 7-chamber revolvers of six different varieties—a very simple, light, strong, and effective weapon. They also make a combination wrench that will fit all the uses of a tool, and is handy in the shop, store, or home, in the many and various uses it will serve. It is quite popular and sells very large.

They have just begun the manufacture of a new iron plane, for carpenters and cabinet makers. The firm have been running four years, are practical and experienced mechanics, and are running their shop full time.

The iron works at Norwood are running on full time.

John Dean & Co., of Worcester, manufacturers of japanned iron plates for painters' and lithographers' uses, employ 25 men, and turn out annually over \$100,000 worth of plates. They also run a shop with 12,000 feet of room, manufacturing trunk rivets. They employ 35 men, and turn out over 100,000 gross a year. The rivets are put up in barrels of 400 gross each. The members of the firm are John Dean and E. Morgan.

On the 15th ult. the Fitchburg Machine Company shipped two car loads of machinery to Philadelphia. They also shipped on the same day to the Saxonville Mills an engine lathe weighing 15,000 pounds, with 20 feet bed, and 50 inch swing. A car load will be immediately shipped to St. John, N. B.

Bricklaying on Winslow's Skate Factory, at Worcester, has apparently been suspended till spring.

MAINE.

The Kennebec Wire Works, at Hallowell are in successful operation.

OHIO.

The Greenup Independent says: The members of the firm known as Buffalo Furnace Company have organized under their charter and made an assignment to John Seaton, as trustee, the trust, however, not to take place until 1876. The furnace is now in successful operation, running up the stock on hand.

The Ohio City Iron and Nail Works, at Martin's Ferry, have in operation 50 nail machines, and contemplate having 50 more at work by the first of May. The Benwood Furnace, at the same place, is blowing.

"Leetonia Manufacturing Company," for the manufacture of tools of all kinds, is the name of a new firm, now locating at Leetonia.

The Cuyahoga Falls Iron Rivet Company are opening out with flattering prospects of success. They have recently received an order from one house in Cleveland for twenty-five tons of rivets.

The Alden Press Works, of Canton, have received an offer of \$40,000 for the right to manufacture their presses in England. They want \$50,000.

The Stillman & Bierce Manufacturing Company, of Dayton (Ziba Crawford, vice president and treasurer; G. N. Bierce, secretary), has just shipped one of their Eclipse turbine water wheels, of which they are the manufacturers, to Hokitika, New Zealand, to drive a mill, an additional evidence of the estimation placed upon machinery of American manufacture, and of the growing foreign demand for the same.

A. Simonds, late of Fitchburg, Mass., is erecting in Dayton, and will soon occupy, a brick shop for manufacturing rag-engine knives and bed plates, planing machine knives, &c., using water-power.

Phosphates and Alum a By-product in Dephosphorizing Iron Ore.

Carl Rademacher & Co., of Prague, exhibited at Vienna, in 1873, some phosphates prepared from the waste phosphorus solutions obtained at Kladno, in Jacoby's process for dephosphorizing iron ore. This process consists essentially in treating the ores with sulphuric acid, whereby the insoluble basic phosphates are converted into acid phosphates and dissolved. By merely heating the solution obtained, a portion of the phosphate of iron and alumina are precipitated, or lime is added to the solution, and the precipitate which forms is employed for agricultural or chemical purposes.

The composition of the precipitate formed by heating is not constant. Several analyses were made in Rademacher's works, where alum is made from it, and will give some idea of its approximate composition. They are as follows:

Phosphoric acid..... 30.74 22.72 24.20

Alumina..... 22.72 25.03 25.34

Oxide of iron..... 1.56 1.78 2.96

Insoluble residue..... 7.07 4.59 3.74

Water..... 39.06 36.19 35.79

Sulphuric acid..... 9.51 9.11 8.89

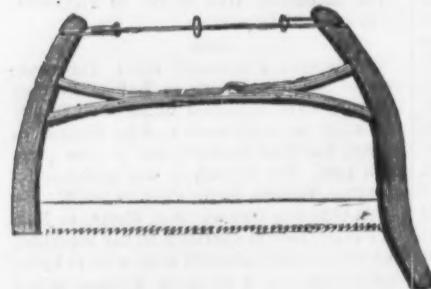
In the first eight months of 1873, in which the Kladno phosphates were made use of, about 90 tons of potash alum was manufactured from them, and the phosphoric acid solution thereby obtained, and containing about 25 per cent., was converted into superphosphate containing 21 to 23 per cent.

Survey of the Isthmus of Darien.

Lieut. Fred. Collins, of the U. S. navy, who is a well known explorer, and an active Fellow of the American Geographical Society, is about to make his fourth journey to the Isthmus. The object of the expedition is to make a more careful and extensive survey of the Napipi route than has been accomplished by previous expeditions. The explorers who have gone there before have had to grope their way laboriously through the country, without maps, roads, or means of transportation, inhabited only by a few straggling families of Indians, and marked with almost impenetrable forests. The present expedition, equipped with maps thus constructed by the former explorers, will be enabled to go directly to the spot where they wish to commence their work, and by confining their labors to a comparatively limited area, it is thought they will be able to acquire, in a short time, all the data required for the construction of the projected canal. Members of the expedition will start on Jan. 2, 1875, for Aspinwall, where they will take the United States steamer Canandagua, which will convey them to the Gulf of Uraba, and furnish them with transportation up the Atrato River to Napipi, where they will begin work. Their return may be looked for in May next. It is believed that this will be one of the most successful expeditions ever sent out by the government.

GEORGE GUEUTAL & SON,
39 West 4th St., New York.
IMPORTER OF
Wood Screws, Steel in Sheets,
BAND SAWS, TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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MANUFACTURER OF
Saws of all kinds.
FACTORY, WILLIAMSBURGH, N. Y.



**THE SILVER STEEL
DIAMOND CROSS-CUT SAW.**

\$1.50 Per Foot.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND
EASE**, is manufactured by E. C. ATKINS & CO., Indianapolis, Ind., who are the
SOLE MANUFACTURERS FOR THE UNITED STATES.
So confident are we that this is the best Cross-cut Saw in the market that we **CHALLENGE THE
WORLD.** Orders promptly filled.

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Saw Manufacturers and Repairers, Indianapolis, Ind.

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HARDWARE FACTORS.**

MANUFACTURERS OF

Bonnev's Hollow

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Stearns Hollow Augers
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Bonnev's Spoke Trimmers

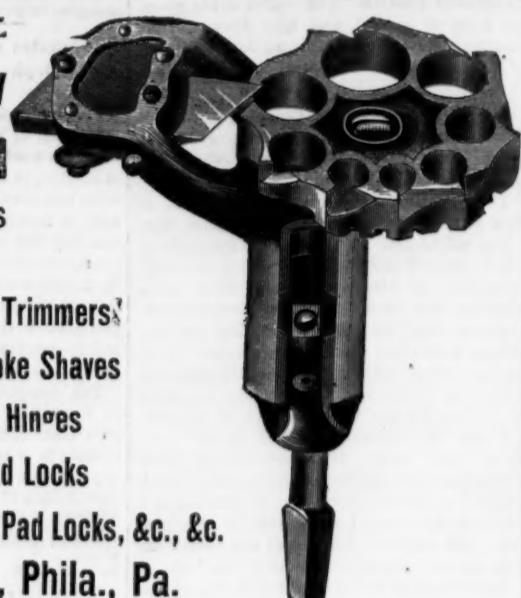
Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.



J. FLINT & CO.
Manufacturers of all kinds of **SAWS** and **PLASTERING TROWELS.**
ROCHESTER, N. Y.

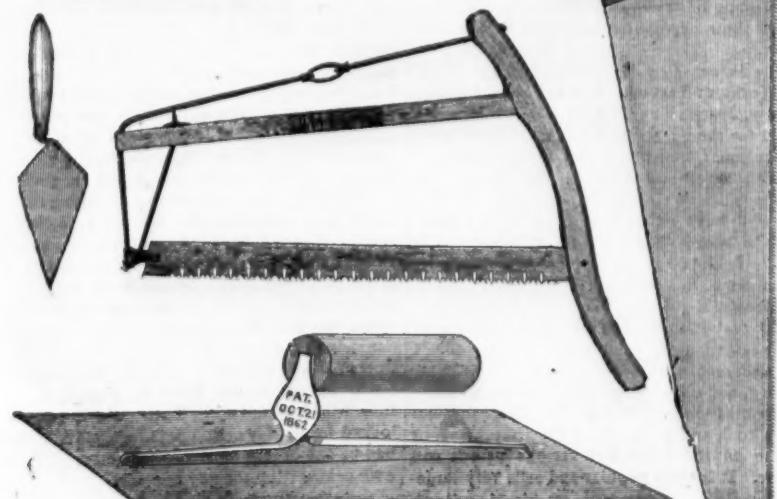
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished Trowels in the world. We make four grades of Plastering Trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

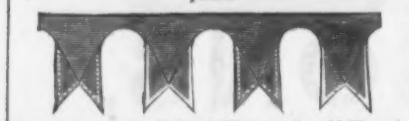
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E. M. Boynton,
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Manufacturer of

Saws of all kinds.
Also Sole Manufacturer of
LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, outlined on M tooth.

I am willing and extremely anxious, on proper notice, to accept a Challenge from H. Disston & Sons, or any responsible Saw Manufacturer, and am ready to back my words with appropriate deeds and \$500 expense, if beaten.

N. B.—With Hand, Billet or Cross Cut Saw, \$500 on each.

E. M. BOYNTON.



Putnam's Government Standard
FORGED

HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
NEPONSET, MASS.

**PYROMETERS
for BLAST FURNACES.**

E. BROWN'S STANDARD PORTABLE.
E. Brown's Improved
Gauntlet:



Edw. BROWN,
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ALSO FOR SALE

PYROMETERS

For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.

E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.



Over 300 "Gauntlet" and 100 Portable Pyrometers are now in use at Blast Furnaces.
Circulars on application.

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&
CLEMSON,**
Manufacturers of Warranted Cast Steel

SAWS

of every description,
including

Circular, Shingle, Cross Cut,
Mill, Hand, Roberts' and
other Wood Saws,
&c., &c.

Cast Steel Files

of the well known brand of

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BRUNDAGE FORGED HORSE NAILS,

Manufactured from

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by BRUNDAGE & CO. Sold by

WHEELER, MADDEN & CLEMSON

Middletown, Orange Co., N. Y.



I make a specialty of the **LARGEST SIZES** of
Circular Saws, and in particular the following points of excellence:
EVENNESS OF TEMPER. The peculiar structure of
my furnace subjects all parts of the saw to a **DEAD** heat, and when dipped in the oil bath secures perfect
temper.

PERFECT ACCURACY IN THICKNESS. My saws are ground on a patent machine, automatic in its

operation, grinding off the thick places upon the

rim, and when the saw is in use it is perfectly balanced.

The saw is removed and the saw is perfectly balanced.

This department is under the personal supervision of

me, who has devoted over twenty years to the art

of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of

all kinds of saws sent on application.

JAMES OHLEN.

The Sugar Maker's Friend.

More agents wanted to can-

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Receipt of 25cts to postage. Address,

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TABLE CUTLERY,
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IN GREAT VARIETY.

Extra Hard Rubber Handle Table Cutlery of our own Manufacture.

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And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

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The only knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the *Best American Knife*. We also make

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which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory or by

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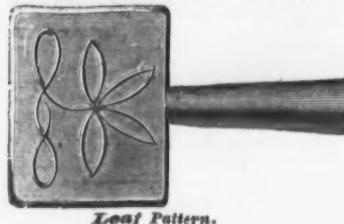
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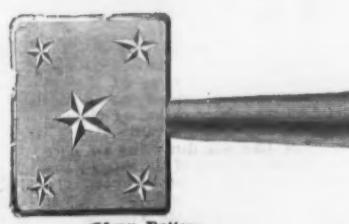
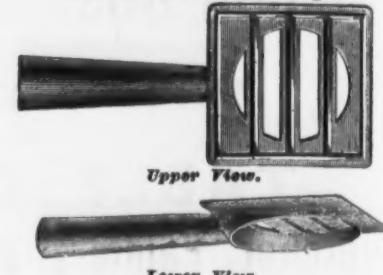
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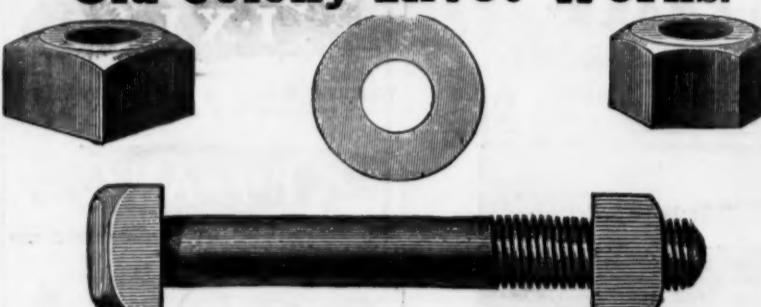
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The Iron Age.

New York, Thursday, January 7, 1875.

DAVID WILLIAMS - *Publisher and Proprietor.*
 JAMES C. BAYLES - *Editor.*
 JOHN S. KING - - *Business Manager.*

NEW YORK, January 8, 1875.
 Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents.

Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

Our rates of subscription will therefore be as follows:

Weekly Edition \$4.50 a year.
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 on the part of carriers in delivering *The Iron Age*;
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 responsible. Our carriers are instructed to deliver
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 and not to throw them in hall ways or upon stairs;
 and it is our desire and intention to enforce this rule
 in every instance.

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Technical Education.

There is evidently a growing interest in this country in the subject of technical education. In many trades in which theoretical knowledge has hitherto been held of little account compared with practical experience, the idea is steadily gaining ground that theory and practice must go together to insure the attainment of the fullest measure of success. The chemist, the physicist, the civil and mechanical engineer, the scientific metallurgist, all find opening before them a wider field of usefulness, as manufacturers in one trade after another call upon them for advice and assistance in perfecting methods and processes now in use, or in devising others which shall be better and more economical. Scientific men are no longer regarded by "practical men" as mere theorists, from whom nothing useful can be learned which is worth a consultation fee. The practical men have learned from experience that

there is something in theory when reduced to a practical application, and that a judicious expenditure of money in scientific investigation and experiment is always a good investment. The next step, which many have already taken, is to give their sons educational advantages which they did not have themselves, by sending them to one of the few technical schools of this country, or one of the many and excellent institutions of this kind in Europe. The next step, let us hope, will be the development of a strong public sentiment in favor of extending the advantages of technical education to the classes in this country which cannot afford to go abroad, or to pay much for tuition at home—the classes from which our intelligent native-born mechanics are drawn. To do this would be to insure to the country the fullest measure of future prosperity. We have varied natural resources, capable of sustaining as great an annual production of useful commodities as any other country of the world, our inventors are ingenious and practical, our working classes, recruited by the immigration of young and ambitious men from abroad, tempted hither by higher wages and larger opportunities, compare more favorably with those of other countries, and we have enough of both capital and enterprise to carry on great manufacturing industries. With these advantages, another generation should build up a vast industrial prosperity upon the foundations already laid, and if, in the education of that generation, we combine the learning of the school with the practical instruction of the workshop and factory, the progress of the next half century will be greater and more rapid than that which the country has witnessed during the past fifty years. It will not do, however, to rely too much upon natural advantages, or to neglect any of the means which experience has shown to be best calculated to render a people capable of making the most rapid progress in the application of the practical arts and sciences which internal resources or external circumstances may render possible. Among these means none are more certain to accomplish important results than abundant facilities for technical instruction. In the lack of such facilities our educational system is essentially defective. In a country which aspires to industrial pre-eminence, brains must stand at the loom and intelligence at the work bench. The practical education of shop and factory is of the utmost importance so far as it goes, but it does not give the average mechanic a knowledge of his trade. No man is a good mechanic who is not fitted to become a master, and no one can become a successful master who does not know the theory as well as the practice of his trade.

The technical schools of Continental Europe have contributed, more than any thing else, to the rapid progress of this and nearly all other countries in devising means for supplying the varied and ever increasing wants of humanity. In France, for example, there is scarcely a manufacturing town of any importance which has not its art school, where whoever will may learn the principles of design upon the payment of a merely nominal fee, and to this fact may be attributed, in great part, the taste and ingenuity of French mechanics. But even with her numerous and useful schools of designs, France is as much below Germany in the matter of technical education as she is above England or the United States, for even in the smallest and most insignificant of the German provinces, as well as in Prussia and the larger States, there is a system of technical education so perfect and thorough that it is difficult to suggest a means of improving it in any essential particular. This system is too vast to be sketched, even in outline, but one State will serve as a sample of the whole. In Wurtemburg, for example, a province with a total population of only 2,000,000, the educational system provides the following institutions: As many elementary schools as there are communes or parishes, at which all children between the ages of six and twelve may acquire the rudimentary branches; 450 primary industrial schools, attended chiefly by girls; 523 farming and trade schools, at which lads of twelve and upward are fitted for husbandry and handicrafts, in morning or evening classes; 76 industrial academies, in which pupils are taught the elements of applied sciences; a great agricultural college at Hohenheim, and a great building-trades college at Stuttgart—the one for giving thorough practical and scientific education to farmers and gardeners; the other, under the control of one of the first architects of Germany, assisted by twenty-eight able professors, for fitting journeymen masons, carpenters, bricklayers and architects' assistants to become foremen and masters in their respective crafts; finally, a polytechnic university in Stuttgart, amply equipped with lecture rooms, modeling rooms, chemical and physical laboratories, a mineralogical museum, a botanic garden, and an

astronomical observatory, where matriculated students may go through complete courses of mathematics, natural philosophy and natural history, engineering, etc., on payment of less than \$20 for the half-year, and where whoever chooses may attend the classes of any of the 51 professors upon payment of a fee equal to about five cents per lesson. From this brief outline of the educational system of Wurtemburg, we may form an idea of the educational system of all Germany, Wurtemburg being behind some of the States and ahead of others in this respect. But admirable as is the German system, that of Switzerland is far superior, the Swiss having gone ahead of all other peoples in combining instruction in the practical arts with instruction in abstract science. The Swiss, as a people, are proverbially frugal, even to parsimony, but toward these and certain other important public objects their liberality is remarkable, and the Polytechnic of Zurich is, perhaps, the most perfect, as well as the most extensive, technical school of Europe. Belgium and Austria also have public systems of technical education which are more or less perfect, and in Great Britain there has been considerable progress in the same direction during the past few years.

It is useless to expect that, even if the importance of free technical education were fully appreciated in this country, we could in many years establish a system of public instruction as perfect, in proportion to our population, as those of Continental Europe. But we can easily make a beginning in this direction which shall prepare the way for a rapid and sustained progress. Nearly all that has been done in this direction has been accomplished by private philanthropy, and we already have a number of very excellent technical colleges and schools, which are always full. There has also been some attempt made to extend our system of public instruction in the same direction. The establishment of a school ship under direction of the New York Board of Education, for the training of boys for the merchant service is a step in the right direction, and will turn out sailors who understand navigation and who are fitted for promotion to responsible commands, over the heads of those who have gained their knowledge of seamanship before the mast and in the forecastle. We also have the institute founded and maintained by the wise benevolence of the venerable Peter Cooper, whose example has been imitated by a few rich men in other cities, though rarely, if ever, with results so completely satisfactory. But we have no system of technical instruction in this country adapted to the wants of the people at large. How this want can best and most quickly be met, without detriment to our existing public school system, is a question which we think should receive the attention of those who make educational problems a study. There is nothing impracticable in the idea of a system of scientific and technical instruction which shall be practically free to all who wish to avail themselves of the facilities offered. Great polytechnic schools, like those of Europe, are not to be looked for as the first fruits of a movement in this direction. Let us first have free evening classes and lectures in suitable buildings, to which young mechanics are invited. Under the charge of competent professors these classes would accomplish great good, and out of such a beginning would soon grow a system of public instruction well calculated to elevate the standard of intelligence among our working classes, and encourage a taste for reading and study on the part of young men who can be made to appreciate the advantages of education in no other way. The great work accomplished by the free classes of the Cooper Union, in this city, always full, shows that such a system as we have suggested would not fail for want of public appreciation.

Patents and Trade Marks in Germany.

We have received from Messrs. Wirth & Co., of Frankfort-on-the-Main, an interesting communication on the subject of the patenting of foreign inventions and the registering of foreign trade marks in Germany, which contains information of interest to our readers. They state that much of the difficulty experienced by foreign inventors in securing German patents is due to the fact that they neglect to make application until patents are unattainable under the law. This has given rise to the belief that German patents are rarely granted. In Prussia this is generally the case with regard to foreign inventions, for the reason that applications are not made until after the publication of foreign patents. In Prussia, as well as in France, valid patents cannot be obtained when the specifications of an invention have been previously published in another country, but for all inventions which are not previously known to the public, patents are

readily granted. It is, therefore, necessary that American inventors should apply for German patents before American patents have been printed.

Another very common mistake is that no German patents are of value if one has been refused by Prussia. Germany has a population of fifteen millions outside of Prussia; all the larger States have well organized patent systems, and patents issued by them are valuable in proportion to the utility of the invention patented and its adaptation to the German market. These are facts of interest to American inventors who have any hope of securing protection in Germany.

We also have an abstract of the law of November 30, 1874, relative to the registration of trade marks in Germany. This law provides that the registration of trade marks which have been in use previous to 1875 cannot be refused, if suitable for registration under the existing law. The registration is made in the name under which the applicant does business. If the applicant changes his business address the trade mark must be registered over again, with the date of the first registration stated. Registration can be cancelled by the person or firm claiming the trade mark, or by the government under certain conditions which need not here be specified. The government charge for the first registration of a trade mark is fifty Riechsmark (about \$12, gold); subsequent registrations are made without charge. Names or devices which have ever been common property cannot be registered. Alterations made in a trade mark which do not change its character, and which are not readily seen, do not invalidate the registration. Foreigners have all the rights of citizens in securing protection for trade marks, if German trade marks are also protected in their country, but the foreign mark must be entered in the register of the empire, the proprietor must "take domicile on the seat of the German Tribunal of Commerce," he must show that his mark is entitled to registration in his own country, and that the duration of the German protection shall not be longer than that granted him at home. The new law goes into operation on the 1st of May, 1875. Trade marks already registered under the existing law will be protected until October 1, but they must then be registered again.

Metal Imports at New York in 1874.

The following is a statement of the importations of metals and manufactures of metals at the port of New York during the calendar year 1874. The quantity, when not otherwise specified, is given in pack-ages:

	Quantity.	Value.
Anvils.	3,863	\$62,137
Brass goods	734	103,266
Bismuth	15	7,834
Bronzes	1,548	287,169
Buckles and anchors	4,805	223,974
Copper	143,436	1,712,996
Copper ore	187	5,461
Cultery	4,671	1,712,996
Gage fixtures	19	6,324
Guns	4,078	57,1743
Gun barrel molds	877	28,333
Hardware	3,465	370,5 3
Iron ore	3,085	15,899
Iron scrap	1,777	5,392
Iron, pig	258,945	5,099,009
Iron, R. R. bars	2,927	518,811
Iron, sheet	3,206	838,888
Iron, other	2,533	22,625
Iron tubes	8,182	4,436
Iron cotton ties	32,691	92,938
Lead, pigs	213,147	1,338,935
Lead, tons	4	413
Metal goods	8,049	96,700
Nails	563	26,904
Needles	678	310,601
Nickel	8	6,201
Oil metal	121	101,751
Plated ware	121	11,500
Platina	57	151,009
Platinum caps	52	52,587
Saddlery	328	63,030
Steel	118,983	1,338,227
Spelter, lbs.	2,467,841	122,691
Silverware	103	19,508
Silver ore, tons	309	25,625
Tin, bbls.	8,182	67,097
Tin plates, boxes	1,018,349	

AMERICAN PIG AND BAR IRON.

Average cost of pig iron on furnace bank, and of merchant bar in mill, from 1850 to 1874, inclusive. Compiled for *The Iron Age*, from original data, by Mr. Wm. E. S. Baker, Secretary of the Eastern Iron Masters Association.

AVERAGE COST OF PIG IRON, 1850 TO 1874.

	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	
	Mar. 1 Dec. 31																									
Cost of Ore to the ton of Pig Iron.....	\$ 5 75	5 44	5 55	5 97	6 65	7 51	7 50	7 75	7 66	7 08	7 45	7 35	7 08	7 49	9 12	13 13	13 19	11 71	10 92	11 86	12 96	12 67	13 64	14 87	14 75	11 13
Cost of Coal to the ton of Pig Iron.....	3 70	3 36	3 65	3 23	3 53	4 63	3 90	3 80	4 06	3 26	3 49	3 25	3 68	3 42	5 41	9 66	7 55	7 44	7 11	7 41	7 08	8 59	7 28	7 45	7 90	7 98
Cost of Limestone to the ton of Pig Iron.....	93	96	1 00	1 06	1 38	1 26	1 16	1 14	1 18	1 15	1 21	1 17	1 11	1 20	1 93	8 5	2 65	2 76	2 51	2 14	2 44	2 08	2 04	1 98	2 03	1 66
Cost of Labor to the ton of Pig Iron.....	2 22	1 61	2 02	2 00	2 45	2 85	2 58	2 30	2 10	1 82	1 87	1 97	1 57	2 07	2 85	4 56	3 46	3 99	3 86	3 46	3 80	3 54	4 69	5	4 40	2 90
Cost of General Contingencies.....	1 65	1 93	2 03	2 63	1 99	2 62	2 91	2 16	2 73	2 88	2 83	2 86	2 67	2 35	1 66	2 01	2 03	1 98	1 90	1 96	3 67	2 77	2 98	3 00	2 39	2 12
Cost at Furnace Bank.....	14 25	13 30	14 34	14 88	16 00	18 87	18 05	17 24	17 73	16 14	16 85	16 61	16 11	16 53	20 97	32 21	27 88	27 88	26 30	26 83	30 04	29 65	30 53	32 41	31 47	25 79
Add interest on capital on a product of 6000 tons.....	1 05	1 05	1 15	1 22	1 37	1 29	1 21	1 47	1 22	1 28	1 36	1 57	1 40	1 59	1 61	1 64	1 80	1 63	1 71	1 85	1 83	75	2 08	2 00	1 80	
Total cost to the producer.....	\$ 15 30	14 35	15 40	16 10	17 37	20 16	19 26	18 71	18 95	17 42	18 21	18 18	17 68	17 93	23 56	33 82	29 52	29 68	27 93	28 54	31 89	31 47	32 33	34 49	33 47	27 59

AVERAGE COST OF BAR IRON, 1850 TO 1874.

	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	
	Mar. 1 Dec. 31																									
Cost of Pig Iron to the ton of Finished Bar Iron.....	\$ 25 65	24 90	25 71	25 25	42 17	42 64	32 84	33 34	30 61	36 54	25 61	25 35	24 36	27 00	41 40	68 60	50 77	50 64	44 53	43 29	43 63	40 52	49	43 24	4 20	31 69
Cost of Coal to the ton of Finished Bar Iron.....	5 70	5 61	5 61	5 81	6 00	8 28	6 59	6 00	5 49	5 17	5 27	5 39	6 19	7 66	8 44	3 03	8 92	9 13	8 64	8 33	8 55	7 55	8 43	8 55	8 46	6 98
Cost of Labor to the ton of Finished Bar Iron.....	0 43	0 17	0 37	7 05	15 12	14 70	12 85	13 06	77	10 68	9 00	1 12	11 78	5 4	8 94	27 45	20 61	22 02	19 87	20 65	8 57	7 70	21 55	20 37	9 02	14 37
General Contingencies.....	4 64	4 83	4 88	0	10 39	10 78	8 88	10 38	10 84	7 91	8 78	8 71	10 03	7 66	9 5	8 03	50	9 44	7 70	7 75	7 03	7 85	5 74	5 83	5 29	6 15
Cost in the Mill, finished.....	46 42	45 51	46 57	49 17	73 68	76 40	61 16	62 78	58 71	50 30	50 56	50 57	52 36	58 36	77 93	127 11	91 80	9 23	80 74	80 02	77 78	73 62	84 83	77 99	73 97	59 19
Add interest on capital on a product of 6000 tons.....	9 56	1 49	1 54	1 50	1 80	1 63	1 59	1 89	1 65	1 60	71	90	75	1 77	80	2 80	2 0	2 05	96	2 09	3 15	2 30	2 23	2 10	1 74	
Total cost to the manufacturer.....	\$ 47 98	47 00	48 11	50 67	75 48	78 03	62 75	64 67	60 36	51 90	52 27	52 47	54 11	60 13	79 73	129 91	93 81	93 28	82 70	82	79 93	75 83	87 05	80 24	76 07	60 93

AVERAGE COST OF BAR IRON, 1850 TO 1874.

	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	
	Mar. 1 Dec. 31																									
Cost of Pig Iron to the ton of Finished Bar Iron.....	\$ 25 65	24 90	25 71	25 25	42 17	42 64	32 84	33 34	30 61	36 54	25 61	25 35	24 36	27 00	41 40	68 60	50 77	50 64	44 53	43 29	43 63	40 52	49	43 24	4 20	31 69
Cost of Coal to the ton of Finished Bar Iron.....	5 70	5 61	5 61	5 81	6 00	8 28	6 59	6 00	5 49	5 17	5 27	5 39	6 19	7 66	8 44	3 03	8 92	9 13	8 64	8 33	8 55	7 55	8 43	8 55	8 46	6 98
Cost of Labor to the ton of Finished Bar Iron.....	0 43	0 17	0 37	7 05	15 12	14 70	12 85	13																		

Captain Eber B. Ward, of Detroit.

We take the following from the Detroit Tribune, of January 2d: At about 10:45 o'clock this morning, Capt. Eber B. Ward suffered an attack of apoplexy while walking on the west side of Griswold street, and in front of the banking office of E. K. Roberts. He had sustained one severe attack of the same malady before, and it is understood that prior to that he had also experienced a slight shock of a similar character. He was at once carried into Mr. Roberts' office, and the attendance of several physicians was secured, but their efforts were all in vain. Indeed, it is probable that he was already dead within three minutes from the time when he was lifted up in the street. Intelligence of his death was, of course, at once conveyed to his family and to many men in different sections of the country, who were interested with him in business pursuits.

Capt. Ward was born in Canada (although an American citizen) in 1811, his parents having fled to that country from Vermont during the same year to avoid the threatening consequences of the pending war. After the war of 1812 was over, Eber's parents returned with their family to the old homestead in the "Green Mountain State," where they remained until he was six years old. His home was located in the town of Wells, one of the most delightful spots in Vermont.

Not long after the "second war" had been ended the tide of emigration resumed its Westward march and in 1818 Eber's parents with their family were among the travelers to the more lucrative fields of the South and West. They had set out for Kentucky, but, being delayed at Waterford, Penn., for some time, and meeting with a misfortune, in the death of Eber's mother, they changed their course and went to Ohio. After a short stay in that State, events gradually pushed them Westward until they were permanently located in Michigan.

Mr. Ward, Sr., first visited Detroit in 1821. This was 16 years after the old town had been destroyed, and at a period when there was but one frame house in the town, the average buildings being of logs, with cedar back roofs. At this time the largest vessel that floated on the lakes was only of 30 tons burden, and when one of these arrived at Detroit's solitary wharf, men, women, and children thronged the river's bank to get a glimpse of the strange visitor. At this period, and for several years afterward, the whole fleet of the lakes could not carry as much as one of the present large grain vessels. And not one which then navigated the lakes was owned in Detroit. There were but three or four then on Lake Erie, and most of them belonged to the English. A public vessel known as the brig Hunter was the only means of water communication between Detroit and Buffalo.

Mr. E. B. Ward accompanied his father to Marine City in 1822, and two years after to MacKincie, where he commenced his marine life by securing the very humble position of "cabin boy" in a small schooner. At this time he was about 15 years of age. Observing his energy and admiring his active qualities, Mr. Samuel Ward, his uncle, the leading shipbuilder of Marine City, called the youthful Eber from his sailor's life and gave him a clerkship in his warehouse. This change marked the beginning of a life of usefulness and importance. Being constantly in connection with interesting marine transactions his growing business talents were rapidly improved.

His first floating investment was a quarter interest in the General Harrison, of which he became master. He took command of this craft in 1835, and managed her successfully until his increasing interests demanded his presence at Marine City. He was subsequently admitted as a partner with his uncle in the place, where he continued a most successful business until 1850, when he withdrew his interest and came to Detroit, where's larger and less occupied field afforded him a peculiar opportunity for success. From that day until within a recent date he pushed the marine interests of Detroit forward with a giant hand. Through his timely efforts our commerce has grown and prospered, and the city's floating property nearly doubled. Although his operations are mostly known to the people of this State, the following list, showing the names of the steamers and sailing vessels he has built, will be valuable. It is impossible, however, owing to frequent changes in ownership, to give the fate of these vessels. Many of them have been lost, and some of them are still actively navigating the lakes and doing honor to their builder: General Harrison, The Champion, Samuel Ward, The Pearl, Atlantic, B. F. Wade, Montgomery, Huron, Detroit, Pacific, Ocean, The Caspian, Planet, Arctic. There are a number of smaller vessels not included in this list.

Within the last few years Mr. Ward had been gradually withdrawing from the vessel business, and investing his extensive capital in another direction. He was interested to the extent of about one million in the Chicago Rolling Mills, and half that amount in a similar corporation at Milwaukee, Wis. His stock in the Wyandotte Rolling Mill exceeds half a million, and his floating property is valued at nearly or quite this amount. He owned real estate to the amount of over two millions of dollars, and had in the neighborhood of three millions invested in different speculations. Just what the value of his property was at the time of his death it is impossible as yet to say.

Capt. Ward has been during many years a prominent member of the Republican Party, and was extensively known throughout the country. He leaves a family of five children by his first wife, all grown up, three sons and two daughters. By his second wife, who survives him, he has two children, a boy of five years old, and a girl two and a half years of age. She is now on a visit to friends in Conneaut, Ohio, and has been telegraphed to.

Capt. Ward leaves a will, made some six or eight months since, of which Messrs. E. B. Winans, of Cleveland, T. C. Owens, of Detroit, and Owen Potter, of Chicago, are executors.

An inquest was held by Coroner Cahill, and the jury found that death resulted from apoplexy.

(We hope to present a sketch of Capt. Ward's career as an ironmaster in a future issue of *The Iron Age*.)

The "universal" system of rolls, says the Pittsburgh Commercial, from its adaptability to roll any sizes of plate beyond the reach of the grooved rolls, has become a great favorite with the manufacturers of iron, and there are quite a number in operation in this city. Messrs. Carnegie & Kloman, it is said, have the largest and finest "Universal Mill" in the United States. This mill has an improved frictional reverse motion gearing, introduced by Mr. Kloman, and also an automatic system of rollers on a long stationary table on each side of the rolls. By this arrangement a piece of iron of three or four tons can be easily handled, so far as the rolling is concerned, as one of 3 cwt. or 4 cwt. Messrs. C. & K. have already rolled plates, with perfectly sound edges, 37 feet long, three feet wide and three-eighths inch thick, and feel confident they can go beyond this, although it is said the foregoing has never been accomplished before. The next in order of size is the Universal Mill at Graff, Bennett & Co.'s Millvale Works, operated with reversing engines, and having automatic rollers for carrying the bloom to and from the rolls. This mill is used exclusively, at present, for rolling Danks furnace blooms, weighing about 1000 pounds each, into bars for subsequent piling and rolling into plates.

Special Notices.

"Special Notice."

WANTED.—To exchange, *First-Class Improved City Property*, in the city of Philadelphia, to the amount of **one hundred thousand dollars**, clear of all incumbrance, for a good article of Pig Iron for same amount, to be delivered here. Address **IRON, P. O. Box 2841, Philadelphia.**

PARTNERS WANTED

More working capital needed. Grounds, Shops, Tools and Machinery, all in good working order. A chance for parties desirous of engaging in the manufacturing business. Correspondence solicited.

Address, **D. WHITING, Ashland, O.**

Dissolution of Partnership

Notice is hereby given that the partnership here-existing exists in the name of "Jesse W. Starr & Sons," between **JESSE W. STARR, BENJAMIN A. STARR, BENJAMIN F. ARCHER, and JESSE W. STARR, Jr.** has this day been dissolved by the undersigned, three of said partners, according to the provisions of their articles of partnership.

The unsettled business of said firm will be adjusted by the undersigned.

JESSE W. STARR, BENJAMIN F. ARCHER, JESSE W. STARR, Jr.

(Dated)

Camden Iron Works, CAMDEN, NEW JERSEY, December 31, 1874.

Wanted.

An experienced Hardware Salesman; a young man preferred, having trade in Pennsylvania, Maryland, and the Southwest. Address, with full particulars, experience, salary expected, and references,

HARDWARE, Herald Office, N. Y.

A man with long experience, and acquainted with the trade, both city and country, deserves a situation as city salesman, manager or general clerk in the wholesale trade. Would accept a position in a factory or in the country. The best of references given from former employers and others in the trade. **U. E. R., P. O. Box 1918, New York City.**

An experienced Machinist, Engineer, and Draughtsman will invest \$10,000 in a Machine Shop and Foundry or Iron Works.

Address, **MACHINIST, Herald Office, N. Y.**

Two Spike makers. Must be good reliable men, and come well recommended. Also, two Feeders. Steady employment and good wages.

Address, **G. W. FAHRIER, Niles, O.**

The undersigned have entered into co-partnership under the name and style of

JESSE W. STARR & SON, and will continue the business at the Camden Iron Works, Camden, N. J., as heretofore.

JESSE W. STARR, JESSE W. STARR, Jr.

CAMDEN IRON WORKS, Jan. 1, 1875.

WANTED.—A HARDWARE TRAVELER OF eight years' experience, well acquainted with all large Western buyers, and who can give the best references, is open for an engagement with a manufacturer, on salary, commission, or both. Address, **W. B. S., Box 3760, P. O., N. Y.**

Wanted.

By an experienced man who has a large acquaintance with the wholesale and retail hardware and house-furnishing merchants throughout the West, a position as traveling salesman. Can furnish good city references. Address, **P. A. C., Office of The Iron Age, 10 Warren St., N. Y.**

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap iron.

GILCHRIST & GRIFFITH, Mount Pleasant, Iowa.

Special Notices.

An Experienced Mechanical Engineer, familiar with estimating and designing Propeller and general Marine Machinery, Locomotive, Corporation Pumping Engines, &c., will shortly be engaged. Would like a superintendence or charge of a drawing room.

Address, for reference, **A. E. W., 114 Fulton Street, N. Y.**

MERCANTILE AGENCY.

For the sale of Hardware or any Mercantile Business. Stores of all kinds for sale and wanted. Parties desirous of going into business can do better than to consult this agency. All clerkships second, best of reference required. Parties wishing clerks or assistants, stamp enclosed gives full particulars. Address, **JOHN J. HARING, Box 1633, Binghamton, N. Y.**

For Sale.

A new machine for making Boiler Rivets, from one-half inch to inch. Also new Bolt Headers, &c., for heading in bolts from three-eights to inch. Duplicate of each in successful operation for ten years. Will exchange for bar iron or wrought scrap.

Address, **RIVETS, Office of The Iron Age, 10 Warren St., N. Y.**

TO INVENTORS.

Patents secured in the United States and Europe, on the lowest terms and varying.

PROMPTLY.

by **A. V. BRIESEN**, Solicitor of Patents and Attorney at Law in Patent Cases.

268 Broadway, N. Y., cor. Warren St.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **THE IRON AGE**. All persons infringing on said patents will be held responsible to the extent of law. **Russell Jennings, DEEP RIVER, Conn., Sept. 7, 1874.**

AGENTS WANTED.

SPECIAL INDUCEMENTS.

We want a first-class agent in every county in the United States, and also in Europe, to sell the world-renowned Wilson Shuttle Sewing Machine, and the Wilson Manufacturing Machinery. We are prepared to offer Extra Good Inducements. For full particulars, apply or address **WILSON SEWING MACHINE CO., 327 & 329 Broadway, N. Y.** Special Inducements to Exporters.

An iron worker of large experience in this country and Eng. and with the best testimonials as to character and capacity, wishes an engagement as manager or foreman of a mill or forge. Has 30 years' experience in the manufacture of bars, hoops, plates, sheets, and puddle steel.

Address, **J. L., Office of The Iron Age, 10 Warren St., N. Y.**

An experienced buyer of Hardware, Tools, Machinery, Saws, &c., will arrange with responsible persons on commission. Purchases made at lowest market rates. Correspondence solicited.

Address, **J. B., Office of The Iron Age, 10 Warren St., N. Y.**

Charcoal Blast Furnaces.

Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported when solicited. Correspondence promptly attended to.

J. M. WHITE, Engineer, 99 W. Alexander St., Rochester, N. Y.

THE CANADIAN BANK OF COMMERCE.

Capital - - \$6,000,000, Gold.

Surplus - - \$1,800,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, J. H. GOADBY, Agents.

MANUFACTURERS

desirous of introducing their goods to the **British and Continental Markets**, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at **99 Cannon Street, London, E. C.**

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per copy, or 30/ per annum, inclusive of postage to the United States.

A PARTNER WANTED

by the 1st of January, 1875, in an established Hardware business, who can put in from \$20,000 to \$25,000, either cash, or stock suitable for jobbing trade.

For particulars, address, **B., Office of The Iron Age, 10 Warren St., N. Y.**

HARDWARE.

FOR SALE in the best business part of Jersey City, a first-class **Tool** and **Hardware** business. Established about 25 years, and doing a fair business.

Apply to **H. LUTTIGEN, 57 Montgomery St., Jersey City.**

EUGENE BISSELL, AUCTIONEER.

Successors to R. T. HAZELL & CO., Store No. 94 Rende Street.

Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

Wanted.

A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, which the advertiser understands in all its branches. Highest references of character, capacity, &c.

Address, **H. D., Office of The Iron Age, 10 Warren St., N. Y.**

THE McHAFFIE DIRECT STEEL CASTINGS CO.

STEEL CASTINGS.

Solid and Homogeneous, guaranteed to stand a Tensile Strain of 25 tons per square inch, and capable of being heated to 2000° F. for extensive **WROUGHT IRON FORGING** or for Iron Castings, where great strength is required. Office, cor. **Evelyn and Levant Sts., Philadelphia.** Send for Circular and Price List.

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THE McHAFFIE DIRECT STEEL CASTINGS CO.

STEEL CASTINGS.

Solid and Homogeneous, guaranteed to stand a

Trade Report.

Office of THE IRON AGE.

WEDNESDAY EVENING, Jan. 6, 1875.

The past week has been without important event in the financial markets, as is usually the case during the holiday season. The money market has been a little disturbed by the preparations making for the disbursement of semi-annual interest, and call loans have ranged 4 @ 7 per cent., gold, and in some instances as high as 1-32 per day. The following are the rates on prime mercantile paper:

	Sixty days.	Four months.
Double named—	6 @ . . .	6 @ 6 1/2
First-class—	6 @ . . .	6 @ 6 1/2
Good—	6 1/2 @ . . .	6 1/2 @ 7
Single named—	6 @ . . .	6 @ 7
First-class—	6 @ . . .	6 @ 7
Good—	7 @ . . .	7 @ 8 1/2
Not so well known—	10 @ . . .	10 @ 12

The gold market has been strong, and the premium has advanced on the strength of rumors of trouble with Spain, and the announcement that the Treasury will sell no gold during January. On gold loans the rates have ranged from "flat" to 7 per cent. for carrying. On Thursday the Treasury sold \$500,000 gold at 11-14 @ 11-15. The January debt statement shows a coin balance of \$82,587,000, less coin certificates of \$32,500,000, and a currency balance of \$13,950,000. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	11 1/2	11 1/2
Friday	11 1/2	11 1/2
Saturday	11 1/2	11 1/2
Monday	11 1/2	11 1/2
Tuesday	11 1/2	11 1/2
Wednesday	11 1/2	11 1/2

Government bonds have remained strong at home and abroad, though a trifle uneasy in London. State bonds are dull. Railway bonds strong, and, in the main, steady.

The stock market has been unsettled and feverish, and prices have had a downward tendency. The principal dealings have been in Western Union, Erie, Lake Shore, Pacific Mail, Wabash, Union Pacific and Northwestern.

The following tables show the foreign movements for the week:

	Imports.	Exports.
1874	1873	1874
Total for week... \$6,296,204	\$3,776,449	\$4,971,137
Prev. reported... 418,720,591	377,907,109	380,355,355
Since Jan. 1.... \$425,017,496	\$380,683,558	\$385,326,150

Included in the imports of general merchandise for the week are:

	Quant. Value.
Brass goods.....	14 \$2,930
Brones.....	13 1/2 3,111
Chain and anchors.....	31 2,061
Copper.....	1,718
Cutlery.....	78 25,762
Guns.....	53 21,547
Hardware.....	36 4,890
Iron plate tons.....	300 7,593
Iron sheet, tons.....	1 150
Iron, other, tons.....	18,614
Iron goods.....	190 14,000
Needles.....	13 4,936
Old metal.....	3,082
Per. caps.....	18 9,669
Saddlery.....	4 667
Steel.....	2,097 31,460
Silver ware.....	5 9,076
Tin, boxes.....	5,955 47,472
Tin, 3680 slabs.....	214,120 42,976
Wire.....	9 1,270
Zinc.....	55,250 3,588

	Exports of SPECIE.
1874	1873
Total for the week.... \$2,815,481	1874
Previously reported.... 59,510,776	
Total since January 1, 1874.... \$63,395,661	
Same time in 1873.... 71,959,043	

EXPORTS EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
For the week.... \$3,513,906	\$4,908,685	\$4,949,329	

Government bonds closed as follows:

	Bid.	Asked.
U. S. Currency 6's.....	11 1/2	11 1/2
U. S. 5-20 reg.....	11 1/2	11 1/2
U. S. 5-20 1861, cou.....	11 1/2	11 1/2
U. S. 5-20 1862, reg.....	11 1/2	11 1/2
U. S. 5-20 1864, cou.....	11 1/2	11 1/2
U. S. 5-20 1865, reg.....	11 1/2	11 1/2
U. S. 5-20 1865, cou, new.....	11 1/2	11 1/2
U. S. 5-20 1866, cou.....	11 1/2	11 1/2
U. S. 5-20 1867, reg.....	11 1/2	11 1/2
U. S. 5-20 1867, cou.....	11 1/2	11 1/2
U. S. 5-20 1868, reg.....	11 1/2	11 1/2
U. S. 5-20 1868, cou.....	11 1/2	11 1/2
U. S. 10-40 reg.....	11 1/2	11 1/2
U. S. 5-8 1861, reg.....	11 1/2	11 1/2
U. S. 5-8 1861, cou.....	11 1/2	11 1/2

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Can. & Hudson Consolidated.....	101 1/2	79 1/2
Lake Shore.....	103 1/2	102 1/2
Rock Island.....	103 1/2	102 1/2
Delaware, Lackawanna & Western.....	106 1/2	105 1/2
Michigan Central.....	81 1/2	78 1/2
Illinoian Central.....	100 1/2	100 1/2
Wabash.....	20	19
Canton Land Co.....	59	58
Western Union Telegraph.....	20 1/2	19 1/2
Atlantic and Pacific Telegraph.....	20 1/2	19 1/2
“Pref.”.....	62	61 1/2
Milligan & St. Paul.....	38 1/2	38 1/2
“Pref.”.....	58 1/2	58 1/2
Panama.....	114 1/2	114 1/2
Pacific Mail.....	33 1/2	33 1/2
Erie.....	28 1/2	28 1/2
Ohio & Mississippi.....	31 1/2	31 1/2
Union Pacific.....	36 1/2	36 1/2
C. & Ind. Central.....	8 1/2	8 1/2
Hannibal & St. Joseph.....	25 1/2	25 1/2
“Pref.”.....	34 1/2	34 1/2
Quicksilver.....	35	34
Maryland Coal.....	19 1/2	19 1/2
United States Express.....	59	59

GENERAL HARDWARE.

The commencement of a new year is usually a dull time in the Hardware trade, and it can be said with great truthfulness that the present season is no exception to the rule. The changes which the first week of 1875 have developed are few and by no means of a radical nature. We hear of some discount sheets in preparation, but these, so far as is at present known, will not record any important changes in the values.

General Hardware.

There is no change to report in the market for Foreign Hardware. The holiday dullness still prevails, and we hear of few inquiries and no transactions of any importance. On the 1st instant the business of the firms of F. Wiebusch and Hilger & Sons, of this city, was con-

solidated under the style of the Wiebusch & Hilger Hardware Co. They will continue to manufacture at Sheffield, England, their special brands of Spring Cutlery and Challenge Razors, and will also represent in this country those manufacturers, both English and German, with whom they have been so long identified. Beside taking orders for importation, they will keep in stock a full line of Birmingham, Sheffield and German Hardware. In addition to the business of importing, it is the intention of the company to add an export business, and they invite parties desirous of introducing their manufactures to the European, West India and South American markets to confer with them. The following gentlemen, well known to many of our readers, are active stockholders in the new company: Gustavus Schiffer, Chas. J. Healy and Wm. R. Penniman. The warerooms of the company are at Nos. 84 and 86 Chambers street.

The Nail manufacturers represented in this city held a meeting on the 31st ultimo, and adopted the following revised card, to take effect January 24. The reduction in the card rate from \$3-75 to \$3-00 for 10d. to 60d., was done with a view of bringing the card and the actual selling price nearer to each other than they have been lately.

COMMON, FENCE AND SHEATHING.

	Per kg.
10d. to 6d.	83 1/2
8d. and 9d.	83 1/2
10d. and 11d.	83 1/2
12d. and 13d.	83 1/2
14d. and 15d.	83 1/2
16d. and 17d.	83 1/2
18d. and 19d.	83 1/2
20d. and 21d.	83 1/2
22d. and 23d.	83 1/2
24d. and 25d.	83 1/2
26d. and 27d.	83 1/2
28d. and 29d.	83 1/2
30d. and 31d.	83 1/2

COOPERS', SLATING AND TOBACCO.

	Per kg.
10d. and 11d.	83 1/2
12d. and 13d.	83 1/2
14d. and 15d.	83 1/2
16d. and 17d.	83 1/2
18d. and 19d.	83 1/2
20d. and 21d.	83 1/2
22d. and 23d.	83 1/2
24d. and 25d.	83 1/2
26d. and 27d.	83 1/2
28d. and 29d.	83 1/2
30d. and 31d.	83 1/2

River Carbonite, \$9; Kanawha House, \$14.25; American Gas, \$7 @ \$7.75; American Cannel, \$13; Pennsylvania and Westmoreland, \$7.65; Murphy Run, \$7.40; Newburg Orel, \$7.50; Sterling Ohio, \$12; Ince Hall, \$17 @ \$18; Liverpool House Cannel, \$10; Liverpool Gas, \$12; Newcastle Gas, \$7.50; Scotch, \$8.

The Coal transported over the Cumberland Branch Railroad during the year ending Dec. 31, 1874, amounted to 249,684 tons, as against 227,739 tons shipped in the corresponding period of last year, showing an increase of 21,943 tons. Over the Cumberland & Pennsylvania Railroad, for the same period, the shipments were 1,965,154 tons, against 2,243,658 tons shipped in 1873, a decrease of 278,504 tons. The total amount of Cumberland Coal shipped by the various companies during the year 1874 amounted to 2,323,195 tons.

OLD METALS, PAPER STOCK, &c.

The market for Old Metals, Rags and Paper Stock has somewhat improved since last week, and business was very active in some departments. White Rags, No. 2, still continue in good request, and are scarce in the market. The demand for Hemp and Grass Rope is very light, and stocks are abundant in dealers' hands. Old Metals still continue dull, and prices display weakness. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 4¾c.; Pewter, No. 1, 18c. per do.; No. 2, 16c. @ 12c.; Spelter, 5c. @ 5½c.; Wrought Iron, 1½c.; Sheet do., ½c.; Cast do., ½c.; Machinery, do., ½c.

Rags &c.—Canvas, Linen, 5½c. per do.; Cotton, No. 1, 6c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1c.; Jute, Butts, 1½c. @ 2c.; Kentucky Bagging, 2c.; Book Stock, 2c.; Waste Paper and Scraps, 1½c.; Kentucky Blue Rope, 4c.; Oakum, Junk, No. 1, 4½c. @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 2¾c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending January 5, 1875:

Hardware.		Leaycraft & Co.
Boker Hermann & Co.		Scrap, pugs., 15
Mdse. pkgs., 13		Pattin. O.
Decrav, Aymar & Co.		Scrap, rails, tons, 25
Chains, 5		Order.
Field A. & Co.		Pig, tons, 400
Hinrichs C. F. A.		Steel.
Pattin. 1		Barton, Alexander & Walker.
Lau & Gericke.		Wire, cks., 7
Mdse. pkgs., 1		Naylor & Co.
Lennox E. S. & Co.		Cases, 16
Wire ties, lots, 25		Prosser Thos. & Son.
Mason John W. & Co.		Spring, bds., 54
Wire rope, coils, 7		Robbins C. & Son.
Roosevelt S. & Co.		Bundles, 41
Casks, 3		Cases, 4
Casks, 1		Order.
Saxton & Scobey,		Bundles, 284
Casks, 5		Metals.
Windmuller L. & Bro.		Byrne Joseph & Co.
Packages, 2		Tin plates, cs., 517
Webbush F.		Bruce & Cook.
Chains, 9		Mdse. pugs., 456
Chains, cks., 48		Huxton B.
Mdse. pkgs., 8		Lead, pipe, 5499
Order.		Leaycraft & Co.
Wire, bds., 1498		Scrap, lead, pugs., 2
Iron.		Scrap, brass, pugs., 5
Henderson Bros.		Scrap, copper, pugs., 5
Pig, tons, 200		Scrap, pugs., 4
Mdse. pkgs., 39		Pacific Mail S. Co.
Holdane, Hopkins & Stokes.		Scrap, copper, pugs., 4
H. 20		Philip Dodge & Co.
Lang. W. Bailey & Co.		Mdse. pkgs., 1031
Bars, 76		Tin ingots, 1938
Bundles, 70		Order.
Laugland & Co.		Tin plates, bxs., 1419
Hay bands, bds., 400		Tin, slabs, 500

PHILADELPHIA.

PHILADELPHIA, Jan. 5, 1875.

The market continues without activity of any kind to note, but as this is always the case with the first fortnight of the new year, even in prosperous seasons, the situation at present cannot be taken as any criterion of the business of the month. The fact that production is so greatly curtailed through idle furnaces and labor troubles in rolling mills cannot be long without its effect upon the business of a new year. The principal topic in trade circles is the situation of the Coal trade and its probable effect upon the iron business. In this, parties are almost equally divided, some believing that the result of the present difficulty will be a general reduction in prices of fuel, freight and labor, and hence an advantage to the iron men using Anthracite, while others are equally certain that it can only serve to produce a prolonged strike, and injure all parties concerned. Practically, the situation is an entire suspension of all labor in the Anthracite Coal field, at collieries, and also the announcement by the Reading Railroad Company of a stoppage of work at all the shops of the line, including the Rolling Mill Car Works and Foundries. The last must have some considerable effect upon the iron trade, and should it be followed by like action on the part of the great carrying company's of the Lehigh and Wyoming regions, cannot be injurious to the trade at large. Locally we have to note a slightly improved inquiry for all grades of iron, with no change, however, values, and no immediate reason to expect any, unless it be for rails. In the last product there are, and have been, lately, some considerable transactions effected both here and in New York, and others of still greater magnitude under negotiation, which promise to materially deplete stocks of Foreign Rails at the seaboard and to furnish orders for American mills. In Muck Bar, Scrap and Old Rails there is no material alteration, with a fair inquiry from mills whose puddling furnaces are idle. In steel rails there have been some fair orders placed, and some cash sales of light sections with the expectation of a shortly more active demand. In prices there is no relative change to note, and we quote nominally as follows:

Pig Iron.—No. 1 Foundry, \$24 to \$25; No. 2, \$22.50 to \$23. Gray Forge, \$21 to \$23. Old Rails.—\$27 to \$28.

SCRAP.—\$28 to \$30, as to selections, for No. 1 Wrought.

The sales include some 2000 tons of founders, mixed grades, said to be lower than usual, and 1200 tons Gray Forge on private terms. 500 tons steel rails, light sections, and of several large lots for late summer delivery, which have not been made public. Of iron rails there have been sales made to considerable extent both here and in New York, but which have not been quoted reliably either as to price or quantity. Of Old Rails sales of 500 tons equal to \$28 here, and between 400 and 500 tons scrap, mixed lots, at about quotations.

PITTSBURGH.

PITTSBURGH, Jan. 4, 1875.

Pig Iron.—Trade was exceedingly dull during the past week, as it was expected it would be during the closer days of the old and the opening of the new year, and no improvement can be reasonably looked for as long as the lock-out continues. It is certain that the mills will not buy as long as their furnaces stand idle, unless the price should decline sufficiently to make it an inducement. While the market continues in buyers' favor, as there are holders who are obliged to sell at the best price they can obtain, producers generally are unwilling to make any further concessions in order to effect sales. Prices are lower now than they have been since before the rebellion, and notwithstanding the cost of manufacture has been very much reduced, makers, it is said, are still unable to realize actual cost, and, furthermore, while it is true that the production not only here, but at those points tributary to this market, has been very much curtailed, as a large percentage of the furnaces are out of blast, there is good reason to believe that there is still more pig being made than is being consumed, and that the supply continues to increase. There has been little or no movement in iron since the inauguration of the lock-out; the best evidence of which is that the sales reported during the time in question have consisted mainly of small lots of foundry grades, and this will not continue as long as the strike holds out, as it is not reasonable to expect that manufacturers will enter the market, so long as they have no occasion to do so in the present unsettled and unsatisfactory state of affairs. There has been a continued steady demand for Muck Bar, and the receipts and offerings from the West have fallen off considerably, which may be attributed to the action of the puddlers, who notified the mills making and shipping to Pittsburgh, that unless it was stopped they would strike.

FOREIGN.

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores. 40.00 @ 50.00
" " Tennessee Ores. 36.00 @ 38.00
" " Alabama Ores. 40.00 @ 42.00
" " Georgia Ores. 40.00 @ 42.00
" " Missouri Ores. 40.00 @ 42.00
" " Kentucky. 30.00 @ 42.00

BALTIMORE.

MESSRS. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Jan. 5: Our market remained quiet during the past week, although since the first of the month an improvement is plainly visible.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ½ to 1 thick. 1 2-7-10 to 3 cts. per lb.

Round and square, ordinary sizes, from 1 ½ to 2 inclusive. 2-7-10 to 2c.

Hoop Iron, 1 ½ wide and upward. 4½c. to 4¾c.

Bar Iron from 1 ½ to 4 in. wide. 3¾c. to 4¾c.

Horse Shoe Iron 1 to 1 wide by ½ to 1 ½ thick. 4½c. to 5c.

Black Nail Rods. 7½c. to 8½c.

Black Diamond Cast Steel, Flat, Square, and Octagon, ordinary sizes. 13½c.

Machinery Steel. 10½c.

Cast Spring Steel. 10½c.

Homogeneous Steel Plate. 13c.

Perkins Horse Shoes, per kg. of 100 lbs. 587c.

Mule Shoes. 10½c. to 11½c.

Common Horse Nails, from 14c. to 18c. per pound.

Putnam Horse Nails. 23c. 24c. 25c. 26c. per lb.

Globe Horse Nails. 23c. 24c. 25c. 26c. per lb.

R. R. Spikes. 5½c. by 9-16 ½ ¾c. to 4c. per lb.

Messrs. HOFFMAN, THOMPSON & CO., Iron commission merchants, 23 and 25 South Frederick street, under date of Jan. 5, report the Pig Iron market as follows: We have no change to note in the iron market for this week. Market dull.

Baltimore Charcoal Pig Iron. \$25.00 @ 35.00

Virginia. 30.00 @ 35.00

Alabama. 38.00 @ 30.00

Anthracite No. 1. 25.00 @ 26.00

No. 2. 24.00 @ 25.00

White and Mottled. 17.00 @ 20.00

CHINA.

(Koch & Vierboom.)

HAMBURG, Dec. 18, 1874.—**Metals.**—Owing to the near approach of the holidays we have had a quiet state of affairs in the German metal markets. Copper has been devoid of all excitement. The little done has been for meeting the more immediate wants of consumers. No change has occurred in quotations. Tin.—Little has transpired. The English market has been quite quiet, and in consequence of their continuing wavering the larger dealers, and even consumers, have observed an expectant attitude. Berlin is, nevertheless, steady at 34 to 35½ thalers, English and Banco Lead has been rather better upheld at lately current rates. We quote here as follows: English Soft Pig, 25 to 30 marks; German, 24 to 30½ and Spanish, 25 to 35. Berlin is steady at 7½ to 8½ thalers for Tarnow, Breslau and Stettin. Spots have been taken at both Berlin and Stettin at 35½ to 36½ thalers. The various kinds, the 50 kilos, Breslau is steady at 7½ to 8½ thalers. We are quiet but firm at 24 marks.

HOLLAND.

(Koch & Vierboom.)

ROTTERDAM, Dec. 15, 1874.—Tin.—Offerings have exceeded the demand, and a giving way has resulted therefrom. Banco, auction delivery and paying conditions, has been successively done at 68½, 58, 57½ and 57½ and 57; Billiton, spot, at 65½ to 55½.

CHINA.

(Arnold, Karberg & Co.)

CANTON, Nov. 11, 1874.—**Metals.**—Reuter's telegram reporting an advance of 10/ per ton in the value of this import at home, there has been a brisk speculative demand on the part of foreigners during the latter half of the past fortnight, but no extensive settlements have been made at hardening prices. The market closes strong with an upward tendency. Tin Plates.—The inquiry is rather less active, but previous rates are well supported. Tin is quoted 2½ per cent. per ton higher, and sales are easily accomplished. Quicksilver has again advanced in sympathy with the rising tendency of prices at home. Sales of English are reported at \$238 to \$260 per picul, and are now very small. Tin Plates are dull and drooping. We quote Lead, \$7.35 to \$7.40; Tin Plates, \$8.30 to \$10.00 (per box); Tin, \$24.75 to \$26.50; Quicksilver, English, \$238 to \$240; California, \$241 to \$242. Exchange, 5½ to 5¾c.

EAST INDIES.

(Dummer & Co.)

BATAVIA, JAVA, Nov. 12, 1874.—**Tin.**—On the 12th ultimo, 17,000 slugs weighing 9031 piculs, Billiton, were sold, and brought an average price of 60½ gilders per picul. Nearly all was bought for European account. The next sale will be held Dec. 14, and comprise the same quantity. Exchange, 11 7/10 to 11 6/7 gilders the £ sterling 6 months' sight, London.

COLOMBO (Ceylon), Nov. 25, 1874.—**Plumbago.**

There has been a little more inquiry, both from the United States and London, but owing to scarcity and high prices, and the demand is still rather small, now that universal attention has been called to it. The same will not likely be the case as regards Tin, generally favorably influenced by a sudden extra demand for Plat. s. At all events the unexpected and extensive business for American account in this special article has created quite a sensation, and is most favorably interpreted. In a general sense, the market is not very active, but the sales are easily accomplished. Quicksilver has again advanced in sympathy with the rising tendency of prices at home. Sales of English are reported at \$238 to \$260 per picul

explain the chemical nature of the above elementary substances, and of their various compounds, paying particular attention to hydrogen gas, and after explaining the process of combustion, as exemplified in a burning candle, proceeded to consider combustion in the furnace in the following terms: We will suppose some time has elapsed since any fresh fuel has been thrown on the fire, and we find that the fuel on the bars presents to our view a glowing incandescent mass, with no appearance of smoke, and no flame, and we will suppose that the only access for the air necessary for supporting combustion is through the fire bars from the ash-pit, through the incandescent fuel, and finally away to the chimney, and I need scarcely say that the supposed case is one of very common occurrence. The moment the air comes in contact with the incandescent fuel, it is resolved into its constituent nitrogen and oxygen, the nitrogen passes on to the chimney with no further change than increase of volume from increase of temperature; the oxygen, however, is arrested, and each atom of carbon seizes two atoms of it, and one atom or equivalent of carbonic acid is formed.

If this carbonic acid got away to the chimney, nothing further could be desired, and complete combustion of the coke would be effected. But it is not destined to escape in this manner, for before the atom of carbonic acid has struggled through the mass of fuel, and got free from it, it has taken up another atom of carbon, and now, instead of being carbonic acid CO_2 , it has been converted into CO_3 , or two equivalents of carbonic oxide, and it is this gas which escapes to the chimney. Experiment has proved that carbonic acid is not combustible, but that carbonic oxide is; and it stands to reason if anything of a combustible nature is escaping from the chimney, we cannot be having complete combustion in the furnace; but there are very few practical men who have any idea whatever as to the magnitude of the loss of heat when carbonic oxide is the result of combustion instead of carbonic acid, for we find, from calorimetric experiments, that in the former case we only get three-tenths of the evaporative power produced by the latter. Now, in order to burn this carbonic oxide, we must supply each atom of carbon in it with another atom of oxygen, while the carbon is at a sufficiently high temperature. If the combination is effected, then our carbonic oxide is reconverted into carbonic acid, and has given out during its recombination three-tenths of heat which we noted were deficient in the formation of the oxide.

The next point considered was the gaseous portion of the coal, and it was pointed out how fuel might be lost, either by the gas escaping wholly, or by only being partially burned; the latter alternative causing the formation of smoke and soot. Mr. Carter showed how this latter alternative was generally attributable to the want of a proper supply of air admitted above the fire, or to the flame being brought into contact with the metal plates of the boiler, and so cooled down below the temperature necessary for ignition of the gas, and mentioned the following instance.

Last winter I had a little stove in one of the rooms of my house; it is one of those commonly known as a Gill stove. The whole of the air supporting the fire had to pass from beneath through the bars, and consequently through incandescent fuel before reaching the flue. I was greatly disappointed with the performance of this little stove, as far as its heating power was concerned; eventually I took off the door and drilled a number of small holes in it, so as to admit jets of air above the fire. The fire inside has been as bright and lively again since this little surgical operation, and the quantity of soot collecting in the flue, which before proved a constant nuisance, is now almost reduced to nil. This is an instance of how simply a remedy may sometimes be applied.

After going through various calculations to show the quantities of air required above and below the fire for certain quantities of coal, and how smoke and soot were formed, Mr. Carter concluded in the following terms:

So long as popular errors prevail amongst that class of men who have the direct control of furnaces of all descriptions (I allude to the practical managers or foremen in manufacturing works), little will be done to prevent waste of fuel; and, as a rule, when you begin to speak to them about carbonic acid and carbonic oxide, they look at you with an incredulous smile. You at once lose caste with them, and fall from the high position of a practical man to the pitiable status of a mere theorist. But I maintain that this is not simply a matter of theory, but that the principles involved are of an eminently practical nature, and if applied in practice may be turned to good account. We must impress on the practical man that air is required in certain quantities and delivered in certain methods. We must combat the idea that gas is smoke, or that gas and smoke are synonymous terms. We must point out that volumes of black smoke do not constitute the only indication of waste of fuel, for, as I have shown, the waste may be enormous although there is no vestige of smoke to be seen. We must challenge the idea that a furnace can consume its own smoke, that is simply impossible; we can construct a furnace to prevent the formation of smoke, but let me once be formed and it cannot be consumed in the same furnace, its presence indicating that the furnace is wanting in those conditions essential for the completion of combustion.

Loss of Pressure in Steam Pipes.

It is well-known that the initial pressure in a cylinder seldom equals the boiler pressure; certain exceptions to this rule exist, however, to which we shall refer presently. The loss of pressure is usually attributed to the frictional resistance of the steam pipe and condensation within the latter. There is reason to believe, however, that although such a deduction is

consistent with facts in many cases, it is by no means always so. It is, of course, quite possible to make a steam pipe so small, and so full of bends and sharp turns, that it will cause considerable resistance, and consequent loss of pressure; and it will be found, we venture to say, in all cases where a considerable loss of pressure does really take place, that the steam pipes are made too small and that the velocity of the steam is over 100 ft. per second. The temptation to make long steam pipes too small is very great, because the cost of a considerable length of steam piping is not trifling. When the piping is large enough no loss of pressure worth mentioning will take place, even though the pipe be two or three hundred yards long, so far as frictional resistance can effect the question. There is only one other cause of loss of pressure, and this is condensation in the steam pipe, and this must of necessity be almost wholly inoperative to the assumed end. A little reflection will show that the length of steam piping suspended in air required to condense steam nearly as fast as a boiler can supply it, would be enormous. It is impossible, in short, for a steam pipe of any reasonable length to have much less pressure at one end than the other, provided the velocity does not exceed 100 ft. per second. We may regard the effect of condensation as being the same as though a second engine were put on. If as much steam was condensed as was used by the engine, then the consumption of steam at the further end of the pipe from the boiler would be practically doubled, and the required velocity would then be 200 ft. per second instead of 100 ft.; that is to say, if the pipe were properly proportioned to supply the engine only in the first instance, there would in the second be a small loss of pressure due to the increased velocity of the steam required to make up for condensation; but this would not be due directly to condensation, but to the fact that the steam pipe was too small for its work. The remedy is obvious. Let the steam pipe be protected and the loss of pressure will become little or nothing. One of the best means of protection is to lay the steam pipe under ground in large wooden troughs—waterproof, if the ground be damp—the troughs to be filled with dry sawdust or fine dry sand. If this arrangement be inadmissible, then the pipes should be covered with felt, or some one or other of the various compositions for the purpose in the market. The loss by condensation may, in this way, be reduced to 1 or 2 per cent. of the whole quantity of steam used by the engine. A pipe 12 in. in circumference and 200 ft. long would have 300 square feet of surface, and the total quantity of steam which such a pipe would condense, if exposed unlagged to air at 60°, would not exceed about 72 lbs. per hour. But the sectional area of such a pipe inside would be about 9 in. A cubic foot of steam would occupy 192 in., or 16 ft. of its length, and at 100 ft. per second, the tube would pass 6.25 cubic ft. per second, or 22,500 cubic ft. per hour. The weight of this steam, taking it at 50 lbs. pressure above the atmosphere, would be 4017 lbs. Assuming that the engine used 60 lbs. per horse-power per hour, this would represent over 66 horse-power, and as the loss by condensation would not exceed 72 lbs., it will be seen that it is ridiculous to talk of condensation in the pipe as a cause of loss of pressure. In a word, it may be stated that loss of pressure in a long steam pipe can only take place as a result of the frictional resistance of that pipe to the fluid moving within it; that sharp bends materially increase the resistance; but that if the pipe is tolerably straight and sufficiently large, the frictional resistance will be almost inappreciable; in no case can condensation be a cause of loss of pressure unless the pipe is exposed uncovered to rain, or water in some other form, and that the loss of pressure will then be due, not to condensation, but to the fact that those portions of the pipe near the boiler will be too small to supply the extra demand for steam at the other end of the pipe, unless the steam flows at such a velocity that the frictional resistance of the pipe will operate prejudicially. It is not to be denied, however, that in many instances in practice there is a very serious loss of pressure between the engine and boiler in long pipes. In all such cases, however, the pipes are too small for their work, or they are improperly fitted. We can call to mind one which came under our own knowledge, where the difference in pressure between the boiler and the engine, with a 3 in. pipe about 12 ft. long, was as much as 12 lbs. The engine had only just been started; the stop valve was held to be guilty, and was changed for one larger. This did no good. Then new steam pipes were ordered, and when the old one was taken down, it was found that the whole cause of the mischief lay in the fact that the man who put the pipes up, in making a flange joint, used a ring wrapped with tow and red lead. The inner diameter of the ring, instead of being 3 in., was little more than 1 in. The joint was re-made as it should be, the pipes re-erected, and there was no more trouble. Nothing is more common at collieries and mines than the use of long steam pipes made of any kind of tubing at hand, and of varying diameter, but invariably too small. Then we hear of loss of pressure, and it is on no better basis than this, that the whole theory of pressure being lost, if a steam pipe is long, has been built up. In designing steam pipes, as well as any other appurtenance of a steam engine, nothing is more easy than to make a mistake.

Wilmington Plate and Boiler Iron.

The *Wilmington Commercial* says: It is a fact, which is probably not very well known, that the principal part of the iron ships built in this city are wholly of our production. They are not simply put together here, but the iron is rolled from the blooms, cut to the required

length and size, and shaped and fitted by our own workmen. So of the boilers, machinery, and edge tools which are sent away in such large quantities. We have in our midst the rolling mills necessary for the performance of all this work, but their product is not wholly consumed here, the conscientiousness with which the iron is prepared and the superior quality of the material itself having brought to our manufacturers a large trade from other cities.

In this article it is our purpose to speak only of plate and boiler iron manufacture, to bring into more public notice an interest the extent and importance of which is not sufficiently known and appreciated. Until within a few months past there was but one rolling mill in this city for the manufacture of this class of iron, or rather two mills owned and operated by one firm—Seidel & Hastings. Recently the Christians Iron Co. have erected a similar enterprise on the South side, but, although completed, it is yet without orders sufficient to justify its starting up, and it therefore remains idle. Seidel & Hastings, however, have only recently begun to feel the effects of the dull times, they having been able to secure orders sufficient to keep them busy up to October 1st. Since that time their trade has been quite dull. During October and November they ran, on an average, four days in the week, but during the present they have been making only three days. They run exclusively on orders, and when these are finished the works necessarily stop.

The mills of Messrs. Seidel & Hastings are known as the Wilmington Plate Iron Rolling Mills, and are located on Church street above Ninth. They make plate iron of all descriptions from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in thickness for boilers, iron ships, iron bridges, oil and water tanks, and all the various purposes for which iron plates are used. The works were established in 1845, and consisted for many years of a portion of what is now known as the "old mill," having a capacity for making about 700 tons of plates of the smallest sizes, such as were in demand in those days. The present firm was organized in 1867, and the business gradually extended to more than four times what it originally was. The old mill was enlarged and improved, and in 1870 their large new mill, fronting on Church street, about a half square distant from the old mill, was erected and put in operation. They have also erected a charcoal forge of five fires for the manufacture of blooms from which plates are made.

Perhaps we should explain that the blooms thus manufactured do not constitute the whole of the raw material consumed by this firm. They obtain the remainder direct from the furnaces in the Pennsylvania iron region and from Virginia, the weight of each being from 250 to 280 pounds. The capacity of the works at present operated is 3000 tons of plate iron and about 2000 tons of blooms annually, working in day time alone. The works are not run at night as many rolling mills are. Working day and night, the capacity would be nearly doubled. The mills employ from 100 to 110 men, and when in operation the whole force is engaged.

The machinery is of the most improved kind and ample for the easy and rapid facilitation of the work. There are two large engines for driving the roll trains, and three smaller ones for driving the shears, of which there are 9 pairs capable of shearing plates from $\frac{1}{2}$ to $1\frac{1}{2}$ inches cold. Another engine drives the forge. The steam which moves the engines is generated in four large boilers. There are also two steam hammers for making fire box iron, and one trip-hammer for hammering blooms. The rolls (between which the blooms after being heated in the furnaces are pressed out to the required thickness) in the old mill are 66 inches long by 19 inches in diameter, and in the new mill 77 by 23 inches. Steam lifters are provided for lifting the iron over the rolls, one in each mill, and there are also five cranes for lifting heavy piles and plates of iron, and a patent labor-saving machine which will lift from 1600 to 1800 pounds of iron from the scales and place it upon the wagons.

Such is the character and such are the appliances of one of the weighty industries of Wilmington. It has gradually grown with the city, receiving a large trade and conducting a very profitable business. The product of the mills is largely consumed at home, the iron ship-builders of this city using, to a great extent, their plates in the construction of iron ships. The Harlan & Hollingsworth Co. have used their iron exclusively for the past ten years. In good times they have a large trade in the Eastern States, two large locomotive builders there also using their iron for locomotive boilers exclusively. At present the business is extremely dull and the outlook not encouraging.

Deep Mining.

Many of the leading mining companies on the Comstock lode are now down to the depth of 2000 feet, and a few still deeper. When mining first began on the great lode, such a depth was not thought of, or, if thought of, no one expected to see mining operations carried to such a depth as 2000 feet in less than fifty years. Now, we not only do not feel startled at hearing the great depth of 4000 feet spoken of, but when we see preparation in actual progress, for sinking that far, we think but little of it. The Savage Company, whose works we recently visited, have broken ground for the foundations of new machinery, which is to be sufficiently powerful to sink their main incline to a depth of 4000 feet. This incline is already some distance below the 200 foot level, and is still being vigorously pushed downward. The new hoisting machine will be supplied with two 24 inch horizontal cylinders, of 4 feet stroke, and will be of over 400 horse power. The foundations of this engine are being laid about 80 feet to the westward of the present hoisting works. A building, 50x60 feet in size, will be erected over the new hoisting engine and the machinery connected therewith. The carpenters are already at work framing the timbers for this building. The steel wire rope to be used is to

be 4000 feet in length, and will weigh about 24,000 pounds. It is now being manufactured by John A. Roebling's Sons, Trenton, N. J. It will be a round rope, and the upper end will be two inches in diameter, but 2500 feet of its length will be tapered, and the lower end will be $1\frac{1}{2}$ inches in diameter. The reel on which this cable will wind and unwind will be conical, and the cable will wind about it spirally. The Ophir Company contemplate the erection of similar machinery, and propose pushing their works to a like depth. The Crown Point Company already have in operation machinery of much the same character as that being erected by the Savage folks, and having a cable of sufficient length to sink to the depth of 3500 feet. The Hale & Norcross Company, Consolidated Virginia Company, and other leading companies at this end of the lode, will erect similar powerful works, and will at once plunge down to the great unknown "depths profound," in which lie hidden the silver roots of the Comstock.

—Virginia Enterprise.

We remark that Messrs. John A. Roebling's Sons, of Trenton, N. J., manufacturers of the tapering wire ropes, above mentioned, have secured a patent on the same, the wires of their patent rope being continuous and tapering from one end of the rope to the other. The advantage in using these ropes for avoiding the dead load on the hoisting machinery for deep mining, is very great. At a depth of 2000 feet it is double that of the ordinary wire rope heretofore generally used; at 2600 feet the advantage is three-fold. Practical economy will result from their use when a depth of 1400 feet has been reached. The superior character of the tapering ropes made by the Messrs. Roebling with continuous wires from end to end, will be apparent to the mine operator and engineer when we state that the old method of making tapering ropes, and still in use in Europe, was and is by leaving out wires at intervals, so that a rope with 19 wires to the strand at the larger end would have only seven wires to the strand at the smaller end; and, aside from this defect, would have a multitude of ends of wires along its entire length constantly liable to work out and render the rope ragged, while, at the same time, they would subject it to an unnaturally rapid wear and tear, especially the latter. The Roebling system secures a rope having an equal number of wires throughout each strand, and a perfectly even surface that insures the largest possible wear.

The Scripture of Science.

The Cincinnati *Commercial* publishes the following very clever satire on the teachings of modern scientists, which is presented in the shape of a chapter of scripture according to Tyndall, Huxley, Spencer and Darwin:

GENESIS, CHAPTER I.

1. Primarily the Unknowable moved upon cosmos and evolved protoplasm.
2. And protoplasm was inorganic and undifferentiated, containing all things in potential energy; and a spirit of evolution moved upon the fluid mass.
3. And the Unknowable said, Let atoms attract; and their contact begat light, heat and electricity.
4. And the Unconditioned differentiated the atoms, each after its kind; and their combination begat rock, air and water.
5. And there went out a spirit of evolution from the Unconditioned, and working in protoplasm, by accretion and absorption produced the organic cell.
6. And cell by nutrition evolved primordial germ, and germ developed protogene, and protogene begat eozoon, and eozoon begat monad, and monad begat animalcule.
7. And animalcule begat ephemera; then began creeping things to multiply on the face of the earth.
8. And earthy atom in vegetable protoplasm begat the molecule, and thence came all grass and every herb in the earth.
9. And animalcule in the water evolved fins, tails, claws and scales; and in the air wings and beaks; and on the land they sprouted such organs as were necessary as played upon the environment.
10. And by accretion and absorption came the radiata and mollusca, and mollusca begat articulata, and articulata begat vertebrata.
11. Now these are the generation of the higher vertebrata, in the cosmic period that the Unknowable evolved the biped mammals.
12. And every man of the earth, while he was yet a monkey, and the horse while he was a hippo, and the hippo before he was an orodon.
13. Out of the ascidian came the amphibia and begat the pentadactyle, and the pentadactyle by inheritance and selection produced the hylobate, from which are the simiae in their tribes.
14. And out of the simiae the lemur prevailed above his fellows and produced the platyrhine monkey.
15. And the platyrhine begat the catarrhine, and the catarrhine monkey begat the anthropo-poid ape, and the ape begat the long-armed orang, and the orang begat the chimpanzee, and the chimpanzee evolved the what-is-it.
16. And the what-is-it went into the land of Nod and took him a wife of the long-armed gibbons.
17. And in process of the cosmic period were born unto them and their children the anthropomorphic primordial types.
18. The homunculus, the prognathus, the troglodyte, the antechinus, the terragen—these are the generations of primeval man.
19. And the primeval man was naked and not ashamed, but lived in quadrumanous innocence, and struggled mightily to harmonize with the environments.
20. And by inheritance and natural selection did he progress from the stable and homogeneous to the complex and heterogeneous—for the weakest died and the strongest grew and multiplied.
21. And man grew a thumb for that he that need of it, and developed capacities for prey.
22. For behold, the swiftest men caught the

most animals, and the swiftest animals god away from the most men; wherefore the slow animals were eaten and the slow men starved to death.

23. And as types were differentiated the weaker types continually disappeared.

24. And the earth was filled with violence: for man strove with man, and tribe with tribe, whereby they killed off the weak and foolish and secured the survival of the fittest.

Testing an Iron Beam.

The following appears in the *Albany Weekly Press*, over the signature of Mr. T. J. Sullivan:

During the past few days we have witnessed at the machine shops of Messrs. Townsend & Jackson, the testing of a beam of rolled iron, manufactured at the Passaic Rolling Mills, New Jersey, with the results herein given. If all of the materials of the new capital are as well fitted to bear excessive strain as this has been proved capable of—and we see no reason for doubt on the subject, as far as the iron work is concerned—the durability of that immense structure will prove to be far in excess of the requirements it is ever likely to be called on to withstand. It is especially gratifying to Mr. Sullivan to find by the practical test made, that the quality of the material supplied by him is so very far superior to the limit of strength stipulated for in his contract with the Commissioners.

TEST OF 12 $\frac{1}{2}$ INCH BEAM, MADE BY T. J. SULLIVAN, AT THE WORKS OF MESSRS. TOWNSEND & JACKSON.

The beam was 18 feet 6 inches long, 12 $\frac{1}{2}$ inches high, 5 $\frac{1}{2}$ inches wide, on top and bottom, flanges $\frac{1}{2}$ inch thick, resting one foot on wall on both ends, leaving the space between supports 16 feet 6 inches, and placed two feet from the ground. The beam was then loaded with pig iron (direct in the center) 15 feet in height, making total load of 80,330 lbs., and deflected under the different weights as shown in the following table:

Weight, lbs. Deflection. Weight, lbs. Deflection.

59,076-260 2 $\frac{1}{2}$ inches. 66,167-640 2 $\frac{1}{2}$ " 69,604-920 4 " 70,893-900 4 $\frac{1}{2}$ " 72,182-880 5 " 74,522-765 5 $\frac{1}{2}$ " 75,190-745 6 " 76,801-728 6 $\frac{1}{2}$ " 77,123-970 7 $\frac{1}{2}$ " 77,875-875 7 $\frac{1}{2}$ " 79,701-930 8 " 80,330 8 $\frac{1}{2}$ " Beam commenced to buckle, and continued gradually until stopped loading, when it was found to be when it was found to be buckled 2 $\frac{1}{2}$ inches.

This load was left on 13 $\frac{1}{2}$ hours, in which time the beam deflected 1 $\frac{1}{2}$ inches from constant pressure. The load was then increased to 40 tons with the following result:

Weight, lbs. Deflection. Standing $\frac{1}{2}$ hour.

64,419 2 $\frac{1}{2}$ " 66,167-640 3 $\frac{1}{2}$ " 69,604-920 4 " 70,893-900 4<math

Mr. Bessemer's Channel Steamer.

At last the "Bessemer" is practically completed, and is ready to receive her internal fittings and decorations, so that we may shortly expect to learn by actual trial the value of Mr. Bessemer's suspended saloon, which forms the great feature of the new Channel steamship, and in the execution of which no labor or expense has been spared. The "Bessemer," indeed, promises to be in active service before her ill-fated rival, the "Castalia," has been doctored sufficiently to enable her to go to sea.

The "Bessemer" was constructed for the Bessemer Saloon Ship Company, by Earle's Shipbuilding Company at Hull, from the designs of Mr. E. J. Reed, C. B., and the saloon with all its various fittings, mechanical appliances, etc., was entirely designed by Mr. Bessemer, who has also superintended the whole of the lavish internal decorations.

The "Bessemer" is 350 ft. long, and 40 ft. beam, and her draught such that she can at all states of the tide enter or quit the harbors at Dover and Calais. She is furnished with two independent engines indicating 4000 horsepower collectively, and two sets of boilers, and is propelled by two pairs of paddle wheels 30 ft. diameter, and placed 100 ft. apart. On the upper deck there is a row of state rooms extending the whole distance between the paddle boxes, and projecting 7 ft. beyond the deck on each side, so as virtually to increase the width of the central part of the ship to 54 ft. There are altogether 22 of these private deck cabins, beside a large smoking saloon. The deck itself is 270 ft. long, beside two lower parts at each end 40 ft. in length, and on these the capstans, etc., are fitted. The vessel is provided with a rudder at each end, driven by Brown's hydraulic steering gear, and it can, of course, enter or leave port without turning. Ordinary steering gear is also added. On the deck are placed some hydraulic cranes for transferring luggage, etc., with the utmost dispatch; the baggage will be, at the commencement of the journey, placed in special crates, which are transferred bodily by the cranes into the luggage room in the hold of the ship. Strong rooms for mails, specie, or treasure are also provided here below.

There is on deck a large second class saloon, and a fine promenade is to be found on top of the rows of state rooms already described. The chief point of interest in the ship, however, is, of course, the suspended cabin. In designing such a cabin, it was at once evident that the idea of gaining steadiness by suspension on trunnions like a ship's lamp or compass would prove quite insufficient for the purpose, because, although the compass card is, by means of its suspension on a double axis, maintained in a horizontal plane, it nevertheless rises and falls with the pitching of the vessel; hence, in adapting the principle of suspension to a saloon, it was necessary to place it in the center of the ship's length where the pitching is at a minimum, and in the center of her breadth; further, it was necessary to descend so far down into her hold as to reach a point or center about which the vessel pitches and rolls, and there to establish the points of suspension. But it was equally necessary to check and control the motion which the saloon would acquire if freely suspended.

The plan of placing the saloon in the center of a very long ship rendered it unnecessary to provide against the pitching motion, since the movement of the extreme ends of the saloon can never exceed one-seventh of the pitch felt at the ends of the vessel, because the length of the saloon is only one-seventh that of the ship.

Passengers booked for the saloon enter from the deck a long, covered and well lighted vestibule. Here there is an office, or receiving room, for small parcels carried by passengers; there are, also, on one side of the vestibule, suitable compartments for stowing wet great-coats, umbrellas, &c. The passenger, divested of these impediments, then descends by an easy staircase to a space below deck, and after passing the refreshment counter, enters the saloon at the central part of one of its ends. It should be mentioned that when the passenger first descends from the deck he is still in that part of the structure in which the usual motion of the vessel is felt; but as he advances along the passage before named, the floor on which he walks gradually has less and less of the ship's motion imparted to it, so that by the time he reaches the entrance to the saloon it is ceased, that all motion of the floor shall have ceased.

Arrived in the saloon, he may either ascend the principal stair leading to the promenade deck, or descend by the curved stairs into the saloon, on entering which he will find himself in a spacious apartment 20 ft. in height and 30 ft. wide by 50 ft. long. The saloon is of some what peculiar form, rendered necessary by the motions of the ship which surround it; but notwithstanding its unusual form, Mr. Bessemer has so arranged the structural parts that while great strength and rigidity are obtained, a pleasing architectural effect is given to the whole, which is not a little heightened by the judicious way in which the internal fittings and decorations are arranged. Extending along each side and both ends of this spacious apartment is a dais, along the back part of which a continuous sofa extends. Persons sitting here will be separated,

from those who are promenading on the general floor, while the division of the long sides of the saloon into large bays by partial bulkheads forms a number of comfortable seats partially separated from each other. The overhanging cornice, which is very richly gilt, is supported on fine twisted columns in pale carved oak with a gold spiral bead; the capitals and bases are carved in varied foliage. In the lower part of these divisions are large panels exquisitely carved in oak by Rogers, each having a central shield bearing the monogram of the company; the foliage of the panels consist of acorns and oak leaves, the laurel, myrtle, lily, tea and coffee plants, the tobacco plant, ivy, hops, etc. The back portion of the partial bulkhead, which is richly panelled in pale polished oak with gold moldings, conceals the large circular iron girders springing from the floor on either side and extending to the ceiling of the saloon. In this upper part they are again concealed by a delicate perforated tracery, while the spandrels are filled in with arabesques and figures painted in gray tints on a dead gold ground. All the spaces between, as well as the girders, are covered with polished oak panels, with rich moldings relieved by gilding. The ceiling is divided by deep softs into six large compartments, and is covered with artists' canvas richly ornamented with delicate arabesques and central panels. Extending entirely along the sides of the upper part of the room is a row of circular-headed windows in ground plate glass, which allow a large volume of air to pass continually outward. The spaces below the windows are panelled, the end panels of each set being decorated with arabesques, while each round center panel has a female head after the antique. By the side of each window are long, narrow upright panels ornamented with Cupids and arabesques in a dead gold ground. All the spaces between these decorations are tinted in an agreeable color so as to harmonize in tone with the other parts. At each end of the saloon, and immediately below the girders, is a painting in oil, occupying the large molded oak panel, which is 17 ft. in length.

The whole of the walls of the lower part of saloon, as far as the top of the spiral columns, is panelled in pale oak, the large central spaces are decorated with gold and color enrichments on artists' canvas, forming a frame in which are painted, by Mr. A. S. Coke, figure subjects of life size, the series recording the various critical points in the story of Cupid and Psyche. Each large central panel is flanked by two narrow ones in arabesques executed in quiet gray tints on a dead gold ground. A similar treatment extends along both ends of the saloon, which is also arched over to correspond with the sides, and thus breaks what would otherwise have been a very awkward flat end to the saloon. There is also a raised dais in the center, on which half a dozen luxurious sofas are placed.

The dais which, as before mentioned, extends entirely around the saloon, serves to convey a large body of fresh air for ventilation, taken from a point beyond the paddle boxes, where it is wholly uncontaminated by the engine-room, bilge water, etc.; and it is conveyed under pressure, so that an easily regulated quantity is admitted to the saloon every minute. The air escaping under the small pressure necessary for its transmission expands into spaces formed beneath the dais for that purpose, and then flows through the long line of perforated panels which form the front of the platform on which the passengers are seated. In this way 3000 cubic feet of air per passenger can be forced in every hour; all the air so introduced must as quickly find its way through the window openings near the ceiling, carrying with it all the products of respiration and keeping the air of the saloon as fresh as that on deck. Proper arrangements for warming the air in winter are provided so as to render the atmosphere fresh and agreeable but not too cold. In addition to this spacious saloon there are included in the suspended structure (and, therefore, equally quiet) four well ventilated private ladies' cabins, each 10 ft. in height, 13 ft. wide by 16 ft. long. There are also at the opposite end of the saloon other rooms for smoking and refreshment.

Means are provided for instantaneously locking the saloon to the vessel, this arrangement being made also automatic, so that in case of a sudden breakdown of the controlling gear, the saloon may be securely fastened.

The Puddlers' Strike in Western Pennsylvania.—The Pittsburgh Commercial of Friday says: The fact that Messrs. Lloyd & Black yesterday put their boilers at work at the old rate of wages, \$6 per ton, has led to reports that it is permanent, and that all the mills are soon to resume operations. Upon inquiry we learn that these reports are untrue. Messrs. Lloyd & Black supply articles, specially their own manufacture, and, owing to orders on hand, they were compelled to start their works again, but it will be but for a short time. As to the mill owners generally, we may state that they are more resolute than ever in their determination, from necessity, to hold out for a reduction. As confirming this necessity, we note the fact, by no means encouraging to Pittsburgh, that certain Harrisburg firms are

offering and selling merchantable iron here at prices with which our manufacturers are unable to compete. They are enabled to do this because they are paying only \$4.50 per ton for boiling.

A Giant Telescope.—A telescope of immense proportions has, Galilaeus, been for some time past in course of manufacture at the Paris observatory, but is still far from its termination. It was commenced in 1865 by Mr. Leon Foucault, but the death of that savant and the events of 1870 and 1871 interrupted this work, which were subsequently resumed under the direction of M. Wolf. The power of the new instrument will exceed those of the Cambridge and Herschell telescopes, hitherto the largest known; its length will be 49 feet, and its diameter 6 feet 6 inches, while the dimensions of Herschell's were only 40 feet by 5 feet. The mirror will be of glass, but the surface will be faced with gold or silver. The telescope will be provided with a movable staircase.

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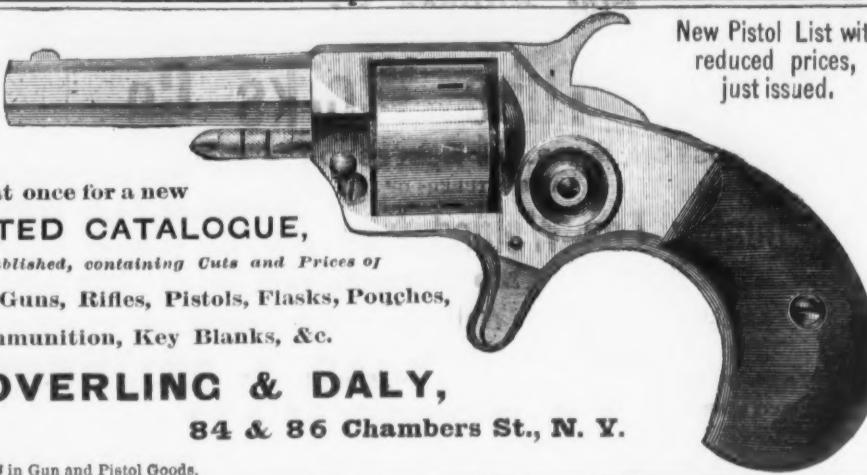
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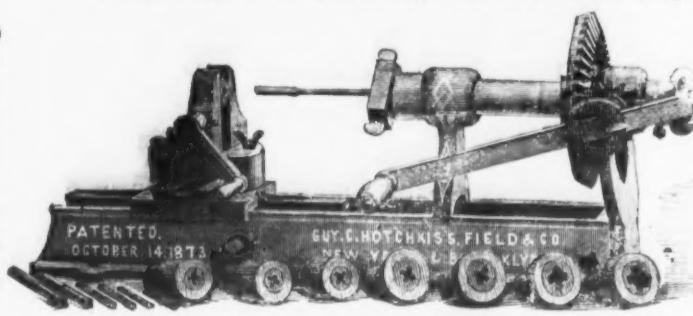
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This machine has revolving and sliding jams, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

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Hardware Specialties,

DOOR KNOBS (Lava, Wooden, Porcelain & Mineral), SHUTTER, PICTURE
AND DRAWER KNOBS,Plate and Drop Escutcheons, Picture Nails and Curtain Pins,
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Alarm Whistles and Mouthpieces,

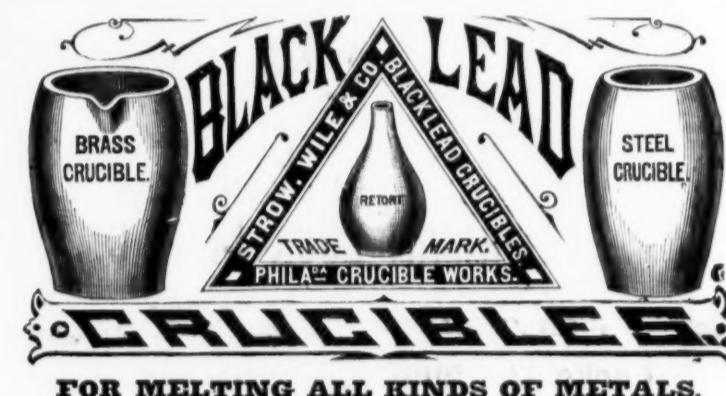
FURNITURE NAILS,

Bright Halter & Coil Chains, French
Wire Nails,

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Having consignment of one of the largest German manufacturers of Halter and Coil Chains
we can offer inducements on these goods.

We shall be pleased to send our new lists and prices to those who will apply.



FOR MELTING ALL KINDS OF METALS,

And Manufacturers of

Sunny Side Stove Polish.

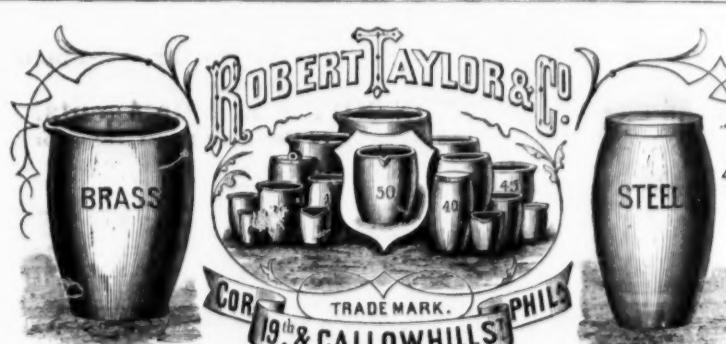
Lumber Pencils, Foundry Facings and Lubricating Plumbago.

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BLACK LEAD CRUCIBLES

Of all Sizes and Forms for melting

Steel, Brass, Gold, Nickel and all kinds of Metals.

Mr. Robert Taylor, who was for seven years the head of the late firm of Taylor, Strow & Co., and who is a practical mechanic, and familiar with all the details of the manufacture of Crucibles, attends personally to our manufacturing department. We would, therefore, respectfully solicit a continuance of the favors hitherto extended to him.

ROBERT TAYLOR & CO.,

No. 1900, 1902, 1904 & 1906 Callowhill, St., Philadelphia,

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Thirty different styles in

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80,000 ALREADY IN USE.

Carpenters,
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All Use Them.Manufactured by the STANLEY RULE & LEVEL CO.,
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AMERICAN LOCK MFG. CO.,

Manufacturers of

FELTER'S**Locks & Latches,**

Comprising

Store Door Locks, Night Latches,
Drawer, Desk and Pad Locks,
All of which are furnished with**SMALL, FLAT, AMERICAN STERLING METAL KEYS,**

Which are stronger than steel, and cannot be affected by rust, and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, they will rival the best made Locks in finish and perfect operation.

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having thirty-five finely finished Brass Tumblers in each Door and twenty-eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.

THE LOCKS ARE FITTED TO THE KEYS,

And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

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Messrs. Riley and Henley's Pudding Furnace.

Messrs. Riley and Henley, English iron masters, have devised a new form of furnace, made in the shape of a circular pan with slanting sides. The pan is made to revolve by any suitable means; the most preferable method being to mount the revolving pan on a vertical shaft, which is set revolving by bevel gear; the shaft is supported by a footstep and a collar or neck bearing, arranged in a cross-shaped bracket, which also at its four legs or arms stays the bottom of the two opposite outer furnace plates, back and front, together.

The driving gear for this revolving pan has two or more motions worked by frictional clutches, and may also, if desired, be worked by a separate engine, the speed of which is under the direct control of the puddler. The top of the pan is formed with a flange all round, either cast on, or made separately of cast or wrought iron and fastened on. This flange or hanging lip dips into a circular trough kept constantly supplied with water, thus forming a water lute, and keeping the air from entering into the pan at any part of the circumference, the outside of the pan at the same time being exposed to a full current of air, especially when the pan is revolving.

To prevent the rushing in of air into the pan from between the trough and the surrounding brickwork, a flange with a hanging lip is fastened to the brickwork all round the trough, the hanging lip also dipping into this trough and forming a lute joint there. To bring about a better diffusion of heat the trough may be made to revolve.

The upper edge of the pan may be cast hollow to form a water compartment all round, and this compartment is connected to a central tube with swivel tube joints at the bottom of vertical shaft, and so arranged as to cause a continual circulation of water.

The other portions of this new puddling furnace are built up and stayed by bolts and plates like the ordinary puddling furnaces, only that the plates at the back and front of the revolving bottom are cut back below, so as to admit the air freely there. An ordinary puddling furnace can thus be easily converted according to this invention.

The tools used in connection with this furnace are somewhat different from the ordinary appliances. During the first stage of the process a tool is employed which resembles the customary rabbler, but having a hook which is caused to rest against the inside of the rabbler hole in order to obtain a hold against the revolving mass of iron in the pan; the iron is thus agitated rapidly while on the boil. During the "boiling" of iron a blast may be used, consisting of a thin, broad, flat current of air, diffused across the surface of the iron in a slanting direction toward the neck of the furnace, and from the side opposite to the rabbler hole. When the iron begins to form the speed is reduced as required, and the puddler then makes use of another tool which the inventors call the plow, because it approaches in its shape the form of a plowshare, and causes a complete turning over, breaking up, and clearing of the iron. When thus sufficiently worked, the iron is balled in the usual manner, and that either from one or both sides and in balls of any required size.

Faught's Patent
ROUND BRAIDED
Belting.

THE BEST THING OUT.

Manufactured only by

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The following superior and well-known Lehigh Coals are mined by ourselves, and firms connected with us.

A. Pardee & Co. HAZLETON, CRANBERRY, SUGAR LOAF

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THE
LONDON MFG. CO.
Copal Varnishes
AND JAPANS.

To Coach Makers, Hardware Manufacturers, Car Builders,

And the Trade generally using

Varnishes & Japans.

Aware of the impracticability of importing these articles at a price sufficiently cheap for use here, we take pleasure in announcing that by our experience in England, Canada and the United States, we are enabled to supply an article which, upon trial, will demonstrate its being EQUAL TO ANY English quick drying quality, as well as for its being durable and brilliant in color.

BRUNSWICK BLACK,

(Self Drying.)

No. 1, \$1.25 per gal. No. 2, \$1.00 per gal.

The London Mfg. Co.,

In submitting the

DAZZLE BLACK BAKING JAPAN

(And their Japans generally)

would call the attention of Sewing Machine Companies, Lock Manufacturers, Japanners and other manufacturers, engaged in handling Japans, to its peculiar qualities both as a preparing and finishing Japan. For the fine work of Sewing Machine Companies, Safe makers, and other manufacturers of all description the Dazzle Black Baking Japans are highly desirable, both as an Iron and Wood Japan.

These Baking and Self Drying Japans contain no coal tar, coal gas nor deleterious substance, but are made from pure and unadulterated gums.

HYATT & CO.,

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Office, New York, 246 Grand St.

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Lawn Mower

For 1875.

PERFECTED WITH

ADJUSTABLE CUT.

Manufactured by

H. M. REED & CO.

Erie, Pa.

Send for Circulars and Price List.

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SOLID BOX VISES,

Hammers, Sledges, Picks,

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Our Vises are Warranted to do more work than any other make. No broken boxes or screws.

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Sole Manufacturers of the celebrated

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MANUFACTURERS OF

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And AUTOMATIC KNIFE GRINDERS

For the rapid and perfect grinding of Planer, Paper Cutting, Leather Splitting and other long Knives.

These goods are unsurpassed for elegance of design, workmanship, capacity and durability. First premium awarded by American Institute, N. Y., 1870 and '73; Medal and Diploma by M. C. M. A., Boston, 1874.

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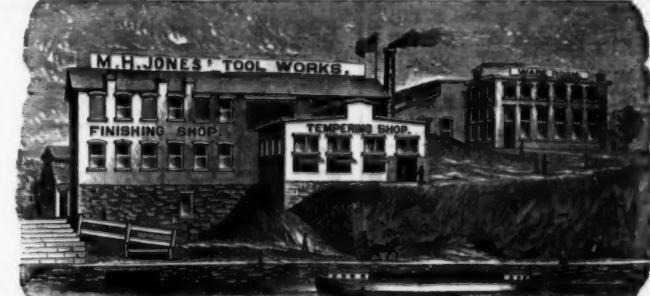
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M. H. JONES & CO.,

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Manufacturers of AXES AND EDGE TOOLS.



Sole Manufacturers of the late TEN EYCK AXE MFG. CO.'S GOODS.

HORACE DURRIE & CO., Agents, 97 Chambers and 81 Beale Streets, N. Y.

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

MANUFACTURERS OF

Barker's Patent Double Reversible Joint Butt Hinges and Concealed Door Springs.

THE BEST IN THE UNIVERSE, ALWAYS RELIABLE.

They never get out of order, and give unbounded satisfaction wherever they are used.

HENRY DISSTON & SONS desire to call the attention of the Hardware Trade; also Architects, Builders, Carpenters, and all parties interested, to the

PATENT REVERSIBLE BUTTS

represented in the annexed engravings.

For the doors of Churches, Schools, Theatres, Banks, Factories, Public Buildings, Hotels, and all places where it is necessary or desirable to swing a door both ways, these Hinges are vastly superior to all others. The neatness of the Butt and the simplicity of its construction make it far more desirable than most of the uncouth and unwieldy hinges now in common use. The concealed spring is the strongest, most durable, and the simplest, consequently the least liable to get out of order.

It is the *neatest*, and being concealed, does not present that unsightly appearance which usually so disfigures doors that have Springs.

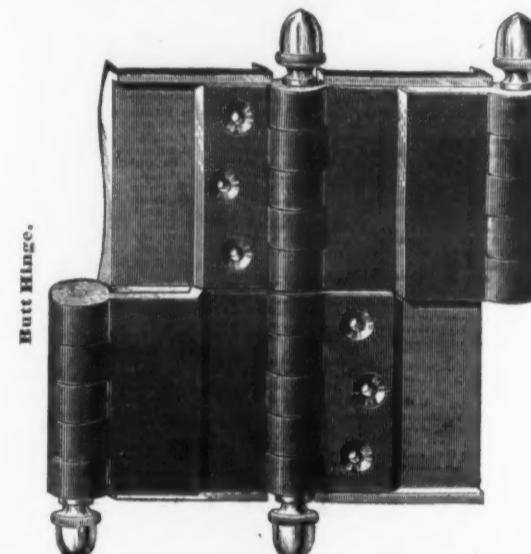
It relieves the Butts of the weight of the door, and consequently adds to the strength.

It prevents the door from sagging.

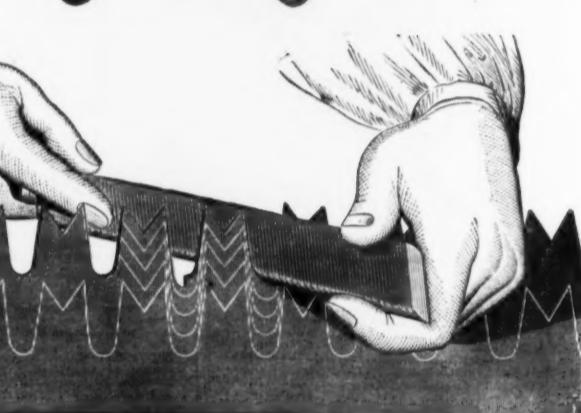
It is more readily applied and easily disengaged, and is altogether the most effective, convenient and elegant Spring that has ever been offered to the public.

Every Spring has been thoroughly tested, is warranted, and will bear twice the strain that is ever applied to a door.

It is by far the cheapest.



Butt Hinge.



DUNN LONGACRE CO.

Cross-Cut Saws.

We desire to call special attention to our various styles of Cross-Cut Saws represented in this week's issue.

THE GREAT AMERICAN.

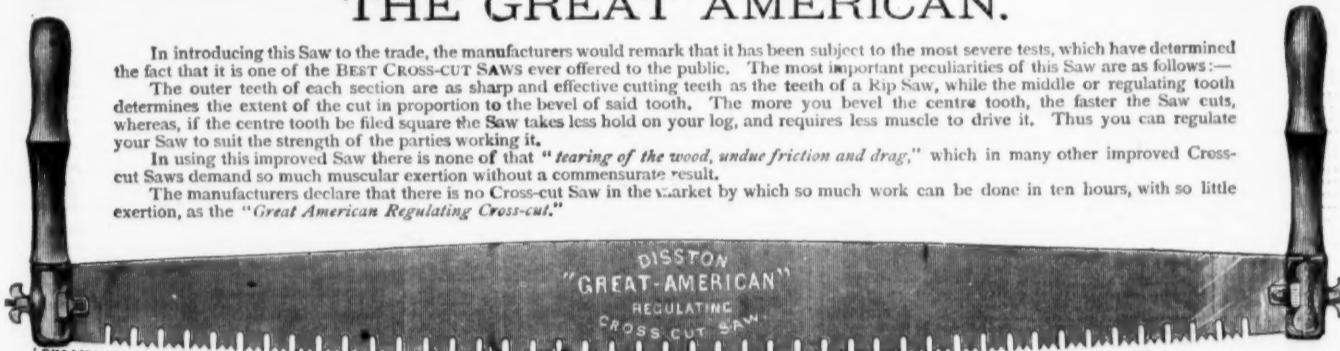
In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the *BEST CROSS-CUT SAWS* ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-Cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."

The above engraving represents a section of "Lumberman" Cross-Cut Saw, with File specially adapted for keeping said Saw in order. By using the File here illustrated, with the edge made to fit the gullet or space between the Teeth, and pressing downward while filing, you will preserve the original shape of the Teeth as described by dotted lines and notch in engraving. You pay for the edge of the File as well as the flat—then why not use it? and thus keep your Saw always gummed and in order, and avoid the risk of breaking or buckling the Saw by the old method of gumming. This File is manufactured expressly for the purpose of keeping in order the Teeth of our Improved Saws known as the Climax and Lumberman, and can be used with equal facility on either Saw. If the File be used according to our instructions, viz.: pressing down in the gullet at the same time the edge of the Tooth is being filed, the effect will be so convincing that persons will never return to the use of the old style File, or any other of the so-called Improved Teeth. We also manufacture a File for keeping the Great American and Climax in order.



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

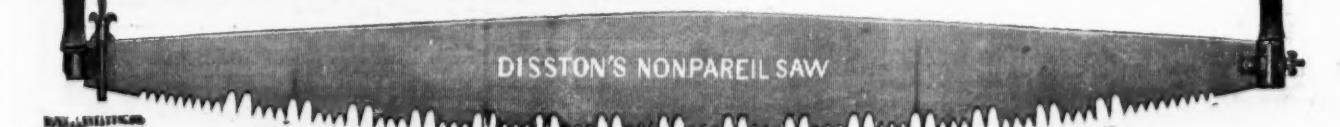
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectively freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



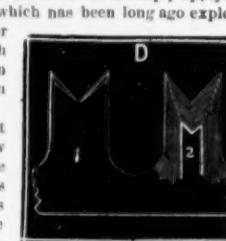
DISSTON'S NONPAREIL SAW



In the manufacture of all our Fast-Cutting Saws, we have carefully avoided the pernicious and destructive practice of making **Under-Cut Teeth**.

All Saws made on this principle are miserable failures. It is simply applying a Rip Tooth to the purpose of cross-cutting, an idea which has been long ago exploded. To get an **Under-Cut**, the Tooth must be wider at the extreme point than at any other part, and each successive filing must result in rapid reduction in the width and ultimate loss of shape, as shown in the annexed diagrams.

No. 1, Fig. C, represents the undercut Tooth as it leaves the factory; Nos. 2, 3, and 4, Fig. C, show how No. 1 most ultimately becomes under any style of filing that may be adopted. No. 1, Fig. D, shows a tooth with parallel edges, and No. 2, Fig. D, shows the shape of said tooth after several filings. The white lines on the diagrams represent the successive cuts of the file.



GAUGE FOR REGULATING CLEANING TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting Teeth, the Cleaning-Teeth projecting through the opening in center of Gauge. Reduce the projecting points by means of a File until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



Showing the Gauge in Position for Filing the Cleaner-Teeth.

Henry Disston & Sons.

New York Wholesale Prices, January 6, 1875.

HARDWARE.

Mouse, Wood Choker.	2 doz holes, 15 @ 16c
" Patent Choker (Union	" 10c
" Tin Co.,	" 10c
" Hornet Wire,	" 10c
" Square,	" 10c
" Cage,	" 10c
" Trap,	" 10c
Lathrop's Brick and Plastering,	10c
Distason's Plastering,	10c
Distason's Brick,	10c
Hose's Brick,	10c
Hose's Brick,	10c
Worrall's Brick and Plastering,	10c
Garden,	10c
Triers,	10c
Pepper Cheese,	10c
Ventilators,	10c
Nickel and Gilt,	10c
Views,	10c
Small Vines, Solid Box,	10c
30 to 100 lbs.	10c
100 and over,	10c
Peter Wright's	10c
Small Box,	10c
30 to 100 lbs.	10c
100 and upward,	10c
Wilson's Parallel,	10c
Small Parallel,	10c
Haskins & Union, Parallel,	10c
Buffalo, Parallel,	10c
Fisher & Morris Double Screw Parallel,	10c
15 & 16c	10c
Merrill's Parallel,	10c
Parker's,	10c
Stephen's Parallel,	10c
Hornell's Parallel,	10c
Small Saw File,	10c
Wheel Barrows,	10c
Canal (Pugley & Chapman),	10c
Cast Iron and Stone (Pugley & Chapman),	10c
Well Handles,	10c
Brass Bushed,	10c
Well Wheels,	10c
Painted Iron,	10c
Wires,	10c
Brass and Copper,	10c
Bright and Annealed,	10c
Nos. 0 to 18,	10c
" 19 to 26,	10c
Galvanized,	10c
Galvanized, Nos. 9 to 6,	10c
Galvanized, Nos. 7 to 18,	10c
Galvanized, Nos. 19 to 26,	10c
Cast Steel,	10c
Tinned Broom Wire,	10c
Galvanized Telegraph, Nos. 8 and 9,	10c
Galvanized Telegraph, Nos. 10 and 11,	10c
Annealed Fence, Nos. 8 and 9,	10c
Grape,	10c
Fence Steel,	10c
Subs' Steel Wire,	10c
Judd's Picture Wire,	10c
Wrenches,	10c
American Adjustable,	10c
Diagonal,	10c
Collins & Co.,	10c
Coe's Genuine,	10c
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Painted Dishes,	10c
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Aiken's ocket,	10c
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Reliance,	10c
Universal-Extra,	10c
Novelties,	10c
Sherman,	10c
Monroe,	10c
King,	10c
Crown,	10c
Europa,	10c
Independent,	10c

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STAMPED TIN WARE, dis 10%.

COMMON STAMPED WARE, a.c.

Bucket Covers.

Quarts, 1/2-1 1/2 2 3 4

Inch, 2-6 9-40 4-25 5-75

Quarts, 10 12

Inch, 8-9 9-12 12-13 13-14

Per gross, 10c 10c 10c 10c 10c

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Quarts, 10c 10c 10c 10c 10c

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Hardware.

SPEAR & JACKSON

Sheffield, England,

MANUFACTURERS OF

Saws, Files, Edge Tools and Steel.

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All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.

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BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.
THE TRADE MARK, IN ADDITION
TO THE NAME,
IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY
JOHN WILSON.

GRANTED A.D. 1766, BY THE
CORPORATION OF CUTLERS OF SHEFFIELD,
AND PROTECTED BY ACT OF PARLIAMENT.
Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

BUYERS ARE SPECIALLY CAUTIONED AGAINST
IMITATIONS OF THE MARK, AND THE
SUBSTITUTION OF COUNTERFEITS
BEARING THE NAME, "WILSON" ONLY.

Three Silver Medals in 1874,
(HIGHEST PREMIUMS)

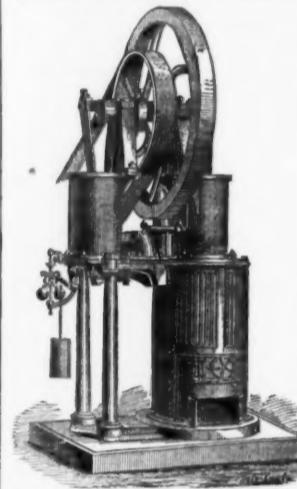
At the American Institute, New York; Cincinnati Industrial
Exposition, Cincinnati; Maryland Institute, Baltimore;

Were awarded for

THE RIDER AIR ENGINE,

The most Economical, Efficient, Safe and Durable
MOTOR IN EXISTENCE.

This Engine is Entirely Free from all the faults of Caloric Engines,
will not get out of order, and is guaranteed equal in power to the best
Steam Engines of same ratings.



NO WATER! NO STEAM! NO ENGINE!

No Steam and Water Gauges to look after!

NO WATER TANK AND PUMP TO
KEEP IN REPAIR!

NO Freezing of Water Pipes!

NO DANGER OF FIRE!

No Additional Insurance!

NO TROUBLE TO RUN IT!

No Explosions! No Danger!

REQUIRES THE LEAST POSSIBLE AMOUNT
OF FUEL,

A 2 Horse Engine running all day on 25
pounds of Coal.

Admirably adapted for all light manufacturing purposes, for Printers, Farmers, Machinists, &c., &c. Also for Pumping at Railroad Water Stations, Residences, Hotels, &c., &c.

PRICE, (Reduced Nov. 2, 1874.)

2 Horse-Power Engine, 10 in. Cylinders, complete, with governor..... \$400

3 and 5 Horse-Power Engines also made. Send for Circular.

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STEAM GOVERNORS WITHOUT COST,

WHEN THEIR SUPERIORITY OVER ALL OTHERS AS THE MOST PERFECT, RELIABLE AND ECONOMICAL

STEAM GOVERNOR IN THE WORLD

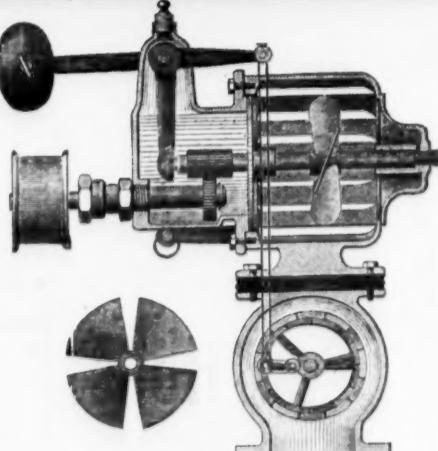
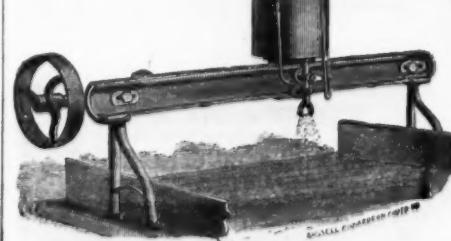
IS NOT FULLY ESTABLISHED BY ACTUAL TEST.

They differ from all others both in principle and operation, and insure
any desired uniform speed under all variations of load or boiler pressure,
largely used by the U. S. Government at Treasury Department, State and
Custom House, New York, &c., also by leading Manufacturers, Establishments,
Rolling, Saw and Paper Mills, Tanneries, &c., throughout the country,
where the most positive and uniform speed is required. Address, for descriptive
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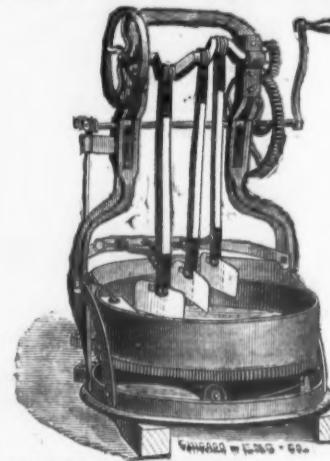
HUNTOON GOVERNOR CO., Lawrence, Mass.

KIRK & PENDERCAST'S
AUTOMATIC
Wool-Oiling
Machines,
For Oiling Wool on First Breaker,
Saves largely in Time, Labor and Material. A most valuable
Against Fire. Recommended by the leading Insurance
NO EXPERIMENT.

Its Value and Fecundity thoroughly established by continual use in many of the leading
manufacturing establishments throughout the country for the past seven years. No Pay-
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E. PALMER BOARDMAN & CO., Lawrence, Mass.



BUTCHER-BOY
Draw-Cut Machines.



SAUSAGE CHOPPERS
AND STUFFERS.
LARD PRESSES.

First premium medal in 1874, at New York, Boston and Cincinnati. For Sale to the hardware Trade.

MURRAY IRON WORKS,
Burlington, Iowa.

PENCIL DIVIDERS.

The following cuts represent a simple contrivance, for which Letters Patent were granted Feb. 24th, 1874. It consists of a metal joint, or hinge, and a pair of points, which may be connected together so as to form a pair of Dividers, which may be used for all the purposes to which Dividers are applicable in drawing, printing, steel plates, &c.

Hardware Dividers will be a very valuable article, as it is useful not only to Architects, Engineers and other Professionals, Draughtsmen, but to all classes of Mechanics.

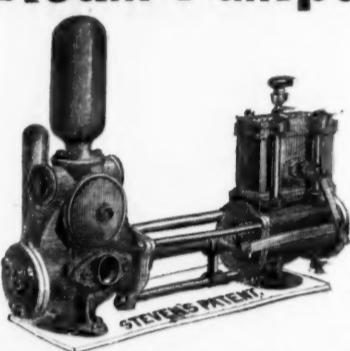
WHOLESALE PRICES TO DEALERS.

Instrument with 2 Points..... \$2.00
and one steel point..... \$3.00
Joint only, with 2 Points..... \$1.50
Steel Points..... \$1.50
Sample dozen instruments with
points sent free by mail for \$3.

Goodnow & Wrightman,
23 Cornhill, Boston,
Wholesale Agents, Cushing &
Barden, 128 Cornhill St., New York;
Cutter, Page, Hoyne & Co., 118
and 120 Monroe St., Chicago.

Fig. 1. Fig. 2.

DIRECT - ACTING
Steam Pumps,



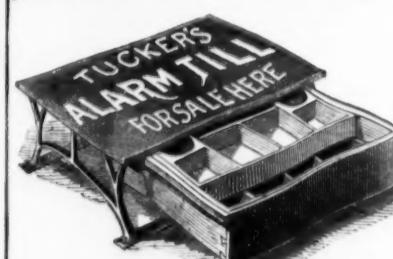
Manufactured and for sale solely by
STEELE & CONDICT,
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Office and Salesroom

88 Liberty Street, New York.

No auxiliary valves used. Direct connection between
piston rod and valve movement. No knocking or jar-
ring. Circulars and price lists sent upon application.

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Alarm Tills.



The above case without the drawer attached, supplied
with first Order, gratis, for Sample Room.

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ENTERPRISE MFG. CO.
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AMERICAN COFFEE
DRUG AND
SPICEMILLS
20 SIZES
FOR SALE BY THE
CHEESEK KNIVES
MOLASSES GATES
MADE BY THE
ENTERPRISE MFG. CO.
20 DIFFERENT SIZES
OF MILLS.
PHILADELPHIA.

WHEELING HINGE CO.,

Wheeling, West Va.,

Manufacturers of

Wrought Butts, Strap & T Hinges, Wrought Hooks,
Hasps & Staples, Wrought Repair
Links & Washers,

GRAHAM & HAINES, Sole Agents, 88 Chambers Street, N. Y.

AMERICAN BUTT CO.,

PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges,

AND

Miscellaneous Hardware.

Send for Illustrated Catalogue.

New York Warehouse with

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ORDERS FOR CASTINGS SOLICITED.

See New Bed Fast.

GEORGE T. RICHARDSON.

FRANK H. SCUDDE.

Middleboro' Shovel Co.,

MANUFACTURERS OF

SHOVELS, SCOOPS & SPADES.Office and Salesroom,
63 OLIVER STREET,
Works Middleboro, Mass.

BOSTON.

J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.

**Coal Hods.****Stamped Corrugated Sheet Iron Bottom Riveted.**

We manufacture six styles having our patent corrugated bottom, and all having the body bottom and hoop riveted together. Dealers before buying will find it to their advantage to get our prices, and also to beware of seammed hods that is in the market, somewhat similar in shape to ours. Don't buy any but the Corrugated Riveted Bottom Hod, manufactured by

SMITH, BURNS & CO., 46 Cliff St., N. Y.

Also Manufacturers of

Galvanized and Japanned Sheet Iron Goods, and Plain, Stamped and Japanned

TIN WARE.

FRY PANS, FIRE SHOVELS, ASH SIFTERS, &c.

Send for Catalogue.

**GREENFIELD TOOL CO.,**

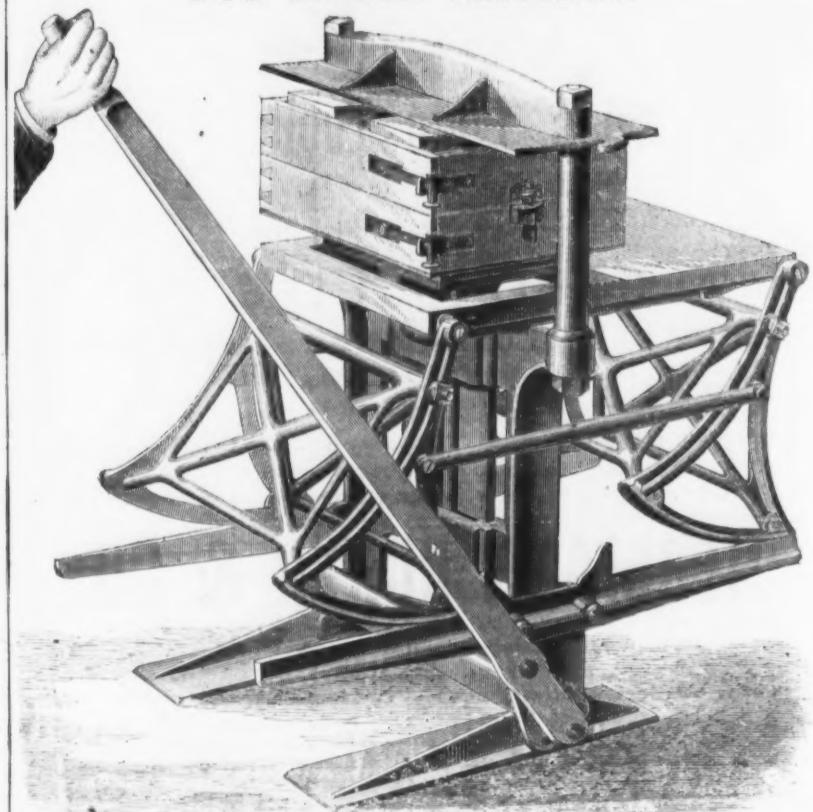
Sole Manufacturers of the Celebrated

"Diamond" PLANE IRONS,

Of Uniform temper and finish. Solid Steel Caps and Warranted. PATENT FORGED OX SHOES. The only shoe made with concavity to fit heel, and the best and cheapest. BENCH AND MOULDING PLANES of every description. Also, FLOW and MATCH Bits, Rounding and Rabbet Irons, Planes, Cuts, Starts, Plates, &c. Send for Catalogue and Prices.

GREENFIELD TOOL CO., Greenfield, Mass.

Warehouse, New York, 37 Chambers St.; Boston, 33 Oliver St. Reduced Prices for 1875.

**Eames' Pat. Molding Machine
FOR METAL CASTINGS.**

The above machines have recently been introduced in several large iron foundries in this country, where they have given entire satisfaction. Among the advantages are:

- 1st. A great saving in the cost of producing castings.
- 2d. A man can learn to mold with the machine in less than 30 days' time.
- 3d. The castings produced will be found more perfect, less poor work, and more uniform than if molded by the old method.

The machine is adapted for either Iron or Brass Castings. For further particulars, send for Circular. Address,

P. & F. CORBIN,

EXCLUSIVE LICENSEES.

New Britain, Conn.

The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

STATIONERS' HARDWARE.

Paper Files, Clips, Pen Racks, Bill Stickers, Match Safes, and Twine Boxes, in Japanned and Enameled Iron and Bronze Metals.

Send for our Catalogue and Appendix. Price \$4.50, and charge remitted on receipt of subsequent orders.

Improved Door Knobs.

On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED and MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat Steel Perforated Keys.

Address

BRANFORD LOCK WORKS,

Branford, Conn.

Cr. THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,
18 & 20 Cliff and 243 & 245 Pearl Streets, New York

NEWCOMB BROS.
Manufacturers of
Smiths', Moulders' and Hand
BELLOWS.

For further particulars send for descriptive circular and price list.

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(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Avails.—Solid Cast Steel.	W. \$ 14c
Peter Wright's.	W. \$ 14c
Wingman's.	11 1/2c
Eagle.—All cents currency.	dis 15 @ 11 1/2c
Apple Pears.—Union.	per doz \$6 50 net
Skeleton.	6 50 net
Victor.	6 75 net
Domestic.	7 00 net
Reading.	7 00 net
Bay State Paring, Coring and Slicing.	12 00 net
" Peach Pares.	10 50 net
Axes.—Mann's Light.	Per doz. \$12 50 @ 12 00
Hunt's Light.	13 00 @ 12 50
Red Indian, all sizes.	12 50 @ 12 00
Red Chilian, all sizes.	15 00 @ 12 50
Crown Prince.	15 00 @ 12 50
Augers and Auger Bits.—Pierce's Pat.	dis 25 @ 30 \$
Douglas & Ives' Bits.	dis 30 @ 10 1/2c
Connecticut Valley Auger Bits.	dis 33 @ 10 1/2c
Cook's Bits.	dis 40 @ 10 1/2c
Jennings' Bits.	dis 10 1/2c
Bates' Nut Augers.	dis 30 @ 10 1/2c
Douglas & Ives' Augers.	dis 30 @ 10 1/2c
Watrous' Ship Augers.	dis 10 1/2c
Bonney's Pat. Hollow Augers.	dis 25 1/2c
Steans' Patent Hollow Augers.	dis 25 1/2c
Balances.—Landers, Frary & Clark's.	dis 40 1/2c
Chatillon.	dis 40 1/2c
Morton's.	dis 40 1/2c
Common Spring with Hook.	W. \$ doz \$1 25 @ 20
Bells.	dis 60 @ 10 1/2c
Other makers' light.	dis 65 @ 10 1/2c
Swiss Pattern Hand Bells.	dis 50 1/2c
Connell's Door Bell.	dis 50 1/2c
Great Western and Kentucky Cow.	dis 50 @ 10 1/2c
Boring Machines.—Bates' Mfg. Co., complete with augers.	dis 15 @ 20 1/2c
Douglas Mfg. Co., complete with augers.	dis 15 @ 20 1/2c
Common Boring Machines, no Augers.	\$4 25 @ 4 00
Angular.	5 25 @ 5 00
Bolts.—Eastern Carrington Bolts.	special prices
Western.	" "
Philadelphia.	5 25 @ 10 1/2c
Wrought Nut.	dis 50 @ 5 00
Braces.—Barber's.	dis 60 @ 5 00
Packus.	dis 10 1/2c
Bartholomew's American Ball.	dis 10 1/2c
Spoard.	dis 10 1/2c
Batts.—Cast Fast Joint, Narrow.	dis 30 1/2c
Cast Fast Loose Joint.	Broad.
Acorn, Loose Pin.	dis 50 @ 10 1/2c
Wrought Loose Pin.	dis 50 @ 10 1/2c
Table Hinges and Back Flaps.	dis 35 @ 10 1/2c
Braces.	dis 10 @ 10 1/2c
Loose Joint.	dis 30 @ 10 1/2c
Reversible.	dis 35 @ 10 1/2c
Parker's Blind Bolts.	dis 35 @ 10 1/2c
Shepard's.	Discount 50% by the case
Chains.	50@10 1/2c
Chains.—German Hanger.	dis 15 @ 20 1/2c
Col.	dis 15 @ 20 1/2c
Galvanized Pump.	W. \$ 15c
best Proof Cou Chain.	15c
W. S. 15c.	10m 2 1/2c
16c.	16 1/2c
17c.	17 1/2c
18c.	18 1/2c
By the case, 500 lbs., discount 50% by the lb. Common Chain.	50c per lb. less than proof.
Chains.—Socket Framing.	dis 60 @ 60 @ 10 1/2c
Chains.—Firmer Framing.	dis 10 @ 10 1/2c
Casters.—Porcelain Wheel.	dis 40 @ 10 1/2c
Iron Bed.	dis 40 @ 10 1/2c
Clothes Wringers.—Universal.	per doz \$10 00
Novelties.	60 00
Monitor.	" "
Decorative and Ornamental.	60 00
Coffee Mills.—Common Box and Side.	dis 10 @ 15 1/2c
Patent Box and Side.	dis 10 @ 15 1/2c
Cutlery.—American Pocket (best).	dis 25 1/2c
Lanterns, Frary, Clark, E. Russell & Co. and Lamson.	dis 25 1/2c
Grounding Mfg. Co., complete.	dis 25 1/2c
Drawing Knives.—Hart Mfg. Co. a.	dis 60 @ 10 1/2c
Concave Adjustable Handle.	dis 10 @ 15 1/2c
Beats.	dis 10 @ 15 1/2c
Fly Pins.	dis 25 1/2c
Flamed.	dis 25 1/2c
W. \$ doz \$2 00.	2 25 1/2c
2 50 1/2c	3 00 1/2c
3 25 1/2c	3 75 1/2c
4 00 1/2c	4 75 1/2c
5 00 1/2c	5 75 1/2c
6 00 1/2c	6 75 1/2c
No. 0 1 2 3 4 5 6 7 8	No. 0 1 2 3 4 5 6 7 8
Flies.	dis 25 1/2c
Nicholson Mill Files.—new list, \$5 00 to 4 1/2c per doz.	dis 12 1/2c
" Bastard.	5 00 to 5 1/2c
" Taper.	5 00 to 5 1/2c
Butcher's Mill.	dis 25 1/2c to 2 1/2c
" Taper.	2 25 1/2c to 2 1/2c
Fluting Machines.	dis 15 1/2c
K. F. M.—1/4 in. rolls, \$5 50.	dis 10 1/2c
" 6 in. rolls, 60 00.	dis 10 1/2c
Mrs. Knox.	6 in. rolls, 60 00.
" 6 in. rolls, 60 00.	dis 10 1/2c
Hammers.	dis 15 1/2c
Yerkes & Plumb's.	dis 15 1/2c
Hammond & Son's.	dis 15 1/2c
Hammerheads.	dis 15 1/2c
Hatchets.	dis 15 1/2c
Batty's.	dis 15 @ 20 1/2c
Shingling and Half.	W. \$ doz \$7 00
No.	7 50
7 75	8 00
8 00	8 25
8 25	8 50
8 50	8 75
9 00	9 25
9 25	9 50
9 50	10 00
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63 00	63 25
63 25	

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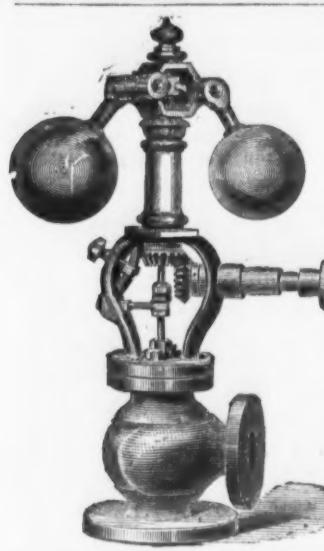
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SAFETY-FUSE at wholesale,



TO ALL WHO USE STEAM-
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We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

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ALSO,
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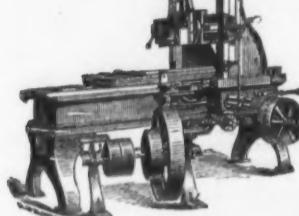
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Have constantly on hand and making



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Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Made to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

**BLAKE'S PATENT
STONE & ORE BREAKER.**

New Pattern with Important Improvements & Abundant Strength

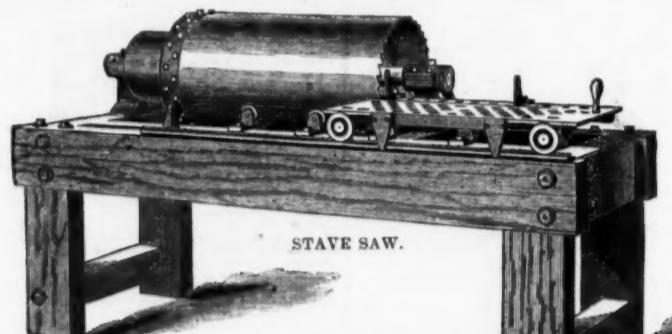


For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

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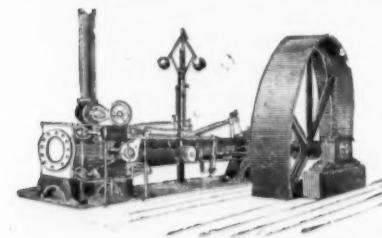
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Gauge Lathes, Screw Machines,
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Tub, Pail and Chair Machinery a specialty, by
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Stationary Engines, Shafting, Mill Gearing,
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Of all descriptions and for all purposes, of any proportion or size, for pumping Hot, Cold, Fresh, Salt, Muddy or Gritty Water, Grain-mash, Syrup, all kinds of Acids, Molasses, and all kinds of thick Fluids. Also for Feeding Steam Boilers, Supplying Tanks, and for Pumping Benzene, Gasoline, Oil, Refineries, Gas Works, Hotels, Breweries, and for all classes of manufacturers; for Draining, Min's and Excavations, and for Rolling Mills, Blast Furnaces and Water Works supplying Cities, Towns and Villages with Water; also, for Wrecking purposes and Steam Fire Engines for Land and Sea.

Also, Manufacturers of Vacuum Pumps, Duplex and Single, and Copper or Iron Vacuum Pans of all sizes and for all purposes, with complete fixtures for Refining Sugar, Corn Syrup, Glue, &c., or for condensing Milk, Extracts, Chemicals, &c., &c.

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With recent valuable improvements.

Steam Boilers
Constantly on hand and made to order of any size or style. Special attention given to the manufacture of

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Of any size or style. Direct all letters to The Woodruff Iron Works, Hartford, Conn., as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

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CAPEWELL'S GIANT NAIL PULLER.

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"It is a convenient, compact and effective tool, admirably adapted to the purpose for which it is devised. Its use cannot but result in a large saving to all having occasion to open packing boxes, as it extracts the nails unbroken, without material injury to the wood of the case."

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Engine Lathes,

From twelve (12) to forty-eight (48) inches swing;

Hand Lathes; Wood Turning Lathes; Vertical Drills; Boring Mills; Tapping and Centering Machines; Screw Press for Mandrels; Grindstone Boxes.

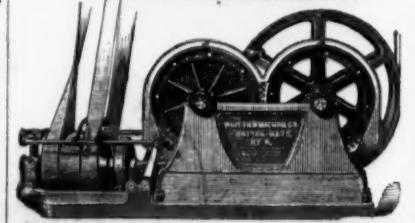
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STEAM ENGINES, BOILERS, ELEVATORS and MACHINERY.



This Company has just received the highest award, a Gold Medal, for Safety Elevators, from the Massachusetts Charitable Mechanics Association.

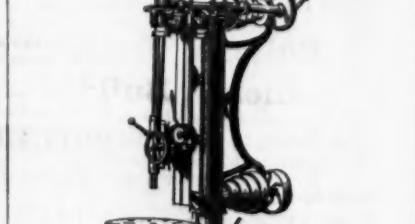
CHARLES WHITTIER, Pres't.

JAMES STURGIS, Pres't.

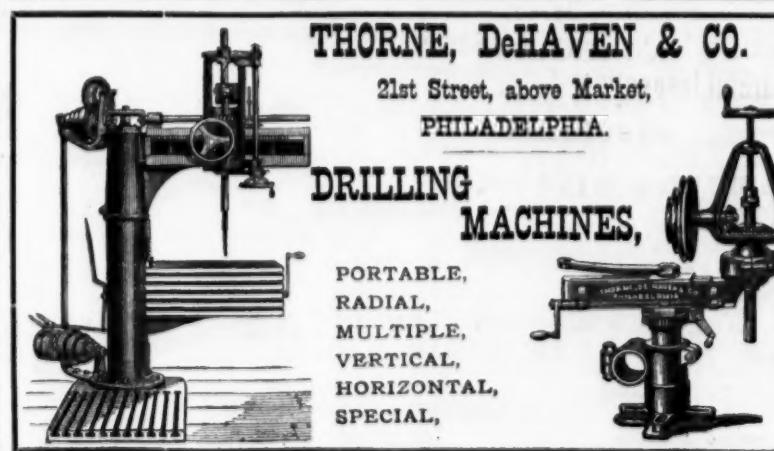
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Manufacturers of the



'BLAISDELL' UPRIGHT DRILLS.
And other First-Class Machinists' Tools.



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21st Street, above Market,

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DRILLING

MACHINES,

PORTABLE,

RADIAL,

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SPECIAL,

TUBAL SMELTING WORKS,
760 South Broad Street, PHILADELPHIA.
PAUL S. REEVES,
MANUFACTURER OF
ANTI-FRICTION METALS
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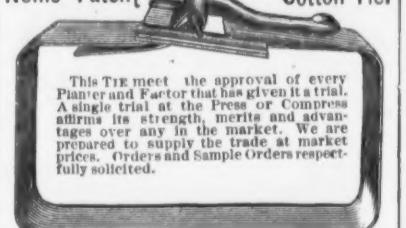
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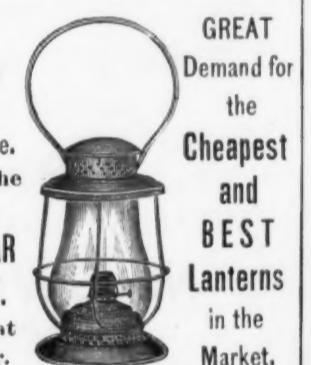
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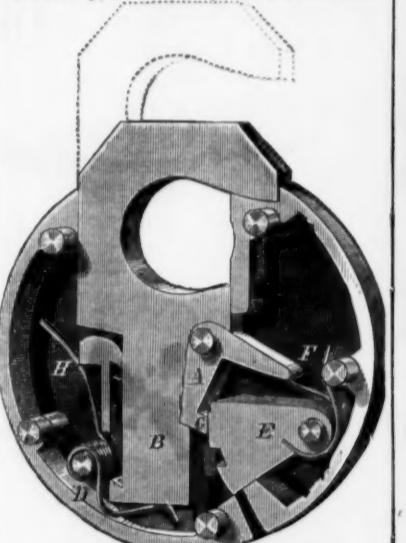
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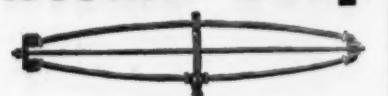
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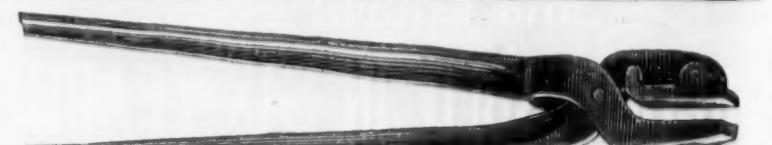
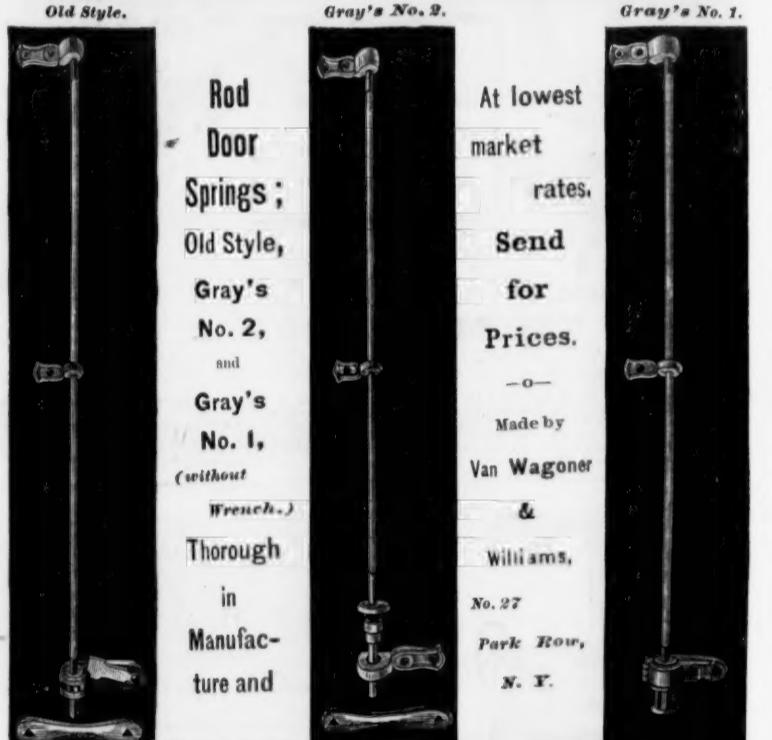
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